

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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Page 27.

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THE IRON AGE

THURSDAY, OCTOBER 6, 1904.

The Launching of the U. S. Battleship Connecticut.

The First of the World's Greatest Type of Modern Fighting Machines to be Built at a Government Navy Yard in Competition with a Private Shipbuilding Establishment.

221
10

DETAILS OF THE CONTEST AND DESCRIPTION OF THE VESSEL AND HER EQUIPMENT.

As the huge steel hull of the United States battleship "Connecticut" rode majestically down the ways in the Brooklyn Navy Yard and safely reached her element, plunging into the East River, last Thursday morning, a

of whether Uncle Sam, with his great organization of naval constructors and navy yards, is in a position to cope successfully with the private corporation in fitting out the American Navy of the future. The launching of



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THE BATTLESHIP CONNECTICUT STARTING DOWN THE WAYS.

record of unusual moment was written upon the scroll of events important to American maritime interests. It is the special auspices under which this particular craft is being built which lend importance to the event, for in her building and in the construction of her sister ship, the "Louisiana," there hangs in the balance the question

the "Connecticut" marked the turning point in the middle of the contest, as both vessels have now passed the baptismal stage, and, lying in their native element, are teeming with activity, which is ceaselessly speeding the work toward the finish of the race.

Two factors enter into the contest—speed and cost.

Until the final decision of the judges is rendered the public can view the race only from the standpoint of the first, for the strictest secrecy is being maintained concerning the element of cost. Strict account of the cost of both vessels is being kept by means of certain definite rules based upon weight and allowed prices of material used. These records are to be submitted to Congress when the ships are completed. As to speed, the contest is about even at the moment, with the advantage, if any exists, being a trifle in favor of the private corporation, the Newport News Shipbuilding & Dry Dock Company, which is building the "Louisiana." The outcome is, however, still a matter of the purest conjecture, for the contestants are so close to one another that there are still ample time and opportunity for the rivals to overtake each other several times before the race is finally finished.

Record Breaking Time.

At the time of launching, the "Louisiana" was 0.545 completed, and when the "Connecticut" felt the first dash of briny spray, last Thursday morning, she was 0.5359 completed, the "Louisiana" having the advantage of nearly 1 per cent. The keel of the "Louisiana" was laid February 7, 1903, and she was launched August 28, 1904. The laying of the keel of the "Connecticut" occurred on March 10, 1903, and she was launched September 29, 1904. This, it will be noted, gives the "Connecticut" a slight advantage over her sister ship in the period consumed between the time of actually beginning the work of construction and launching, which, of course, reduces by a shade the lead of the "Louisiana" shown by the foregoing figures of percentage of completion.

While these figures are of interest by way of comparison, their greatest merit is in the fact that they indicate that both of these vessels are setting a new pace for the shipbuilders of the world. Never before has such speed been attained in the building of war vessels. Naval experts are loud in their praise of Naval Constructor Wm. J. Baxter, and Richard H. Robinson, his assistant, for bringing this about, for when the Government decided to build the "Connecticut" at Brooklyn the yard was far from being properly equipped to undertake the work. For the purpose of installing the necessary equipment Congress appropriated \$175,000.

Unavoidable Delays.

A considerable portion of the amount appropriated was spent for a traveling cantilever crane, which was furnished by the Brown Hoisting Machinery Company of Cleveland and New York. This crane was delivered at a time when labor in and about New York was in a spirit of unusual unrest, and hence the erection of it was delayed considerably. This fact hindered the work at the beginning, but after the crane was placed in operation its aid in facilitating the work was realized immediately. In fact, Assistant Constructor Robinson now states that this apparatus was of the greatest value in enabling him to carry on the construction with the speed which was attained. As cranes of the same type are employed at the Newport News yards, the installation of the one at Brooklyn permitted a perfectly even race. Another cause of delay which handicapped the Government was slow delivery of armor plates. Still another cause was continual dissatisfaction at the outset on the part of employees over the adoption of the piece work system, which brought about constant interference of the labor unions. The naval officials maintained a firm stand on this question, and as a result the system of piece work, never before used in the United States navy yards, was started on this ship, and has been successfully developed. Still another cause for delay was the decision to equip the vessel with four submerged torpedo tubes after the lower portion of the hull had practically been completed.

The last vessel of any size built at the Brooklyn yard was the ill-fated "Maine," an armored cruiser of 6082 tons, which was constructed on the old granite building slip, then under a ship house, and from which many of the wooden vessels of the old navy were launched. The size and capacity of this slip were not sufficient for the new ship, indicating the growth of ideas in a period of

12 years between the launching of the "Maine" and the beginning of the "Connecticut," and a new slip for the purpose of constructing the "Connecticut" had to be built. Material was therefore purchased for the slip and the work of driving piles, excavating and building the foundation and extending the craneway was immediately undertaken. Simultaneously with this work the making of working plans for the construction of the vessel, the ordering of material and the expansion of the yard and drafting force necessary to provide for the work were carried on.

All the work of building the complete battleship is to be done at the navy yard except the construction of the guns and mounts, which, as in all cases in the United States Navy, are made at the United States Naval gun factory at Washington, D. C., under the direction of the Bureau of Ordnance. The manufacture of raw materials and the making of armor, dynamos, motors and specific fittings, which can be more advantageously supplied by private establishments, are to be done outside, but the propelling engines and all other accessories and fittings, which, on a modern war ship, are little short of innumerable, are made within the navy yard walls.

The work on the slip and the material progressed to such an extent that the keel was laid March 10, 1903, and the work continued steadily from that time. Up to the date of launching the principal dates of interest in connection with her construction are as follows: First material ordered October 1, 1902; first material received December 11, 1902; keel laid March 10, 1903; stem erected July 28, 1903; first armor received January 9, 1904; first armor put on board April 24, 1904; first boiler put on board July 7, 1904.

In building the "Connecticut" the naval constructors have had a factor to deal with which was far more serious than any of the obstacles cited above. A miscreant bent on wrecking the vessel has been at work. So cunning and dastardly have been the efforts of this wretch that the keenest vigilance and most extraordinary precautions had to be maintained through the entire work. The attempts were, of course, all foiled by the watchfulness of the naval constructors. The fact that the vessel was constantly under the strictest guard confirms the belief that one of the workmen on the ship is guilty of the crime. While no official information can be gained as to the suspicions of the Government, the work is connected by common report with the recent labor disturbances at the yards.

The Launching.

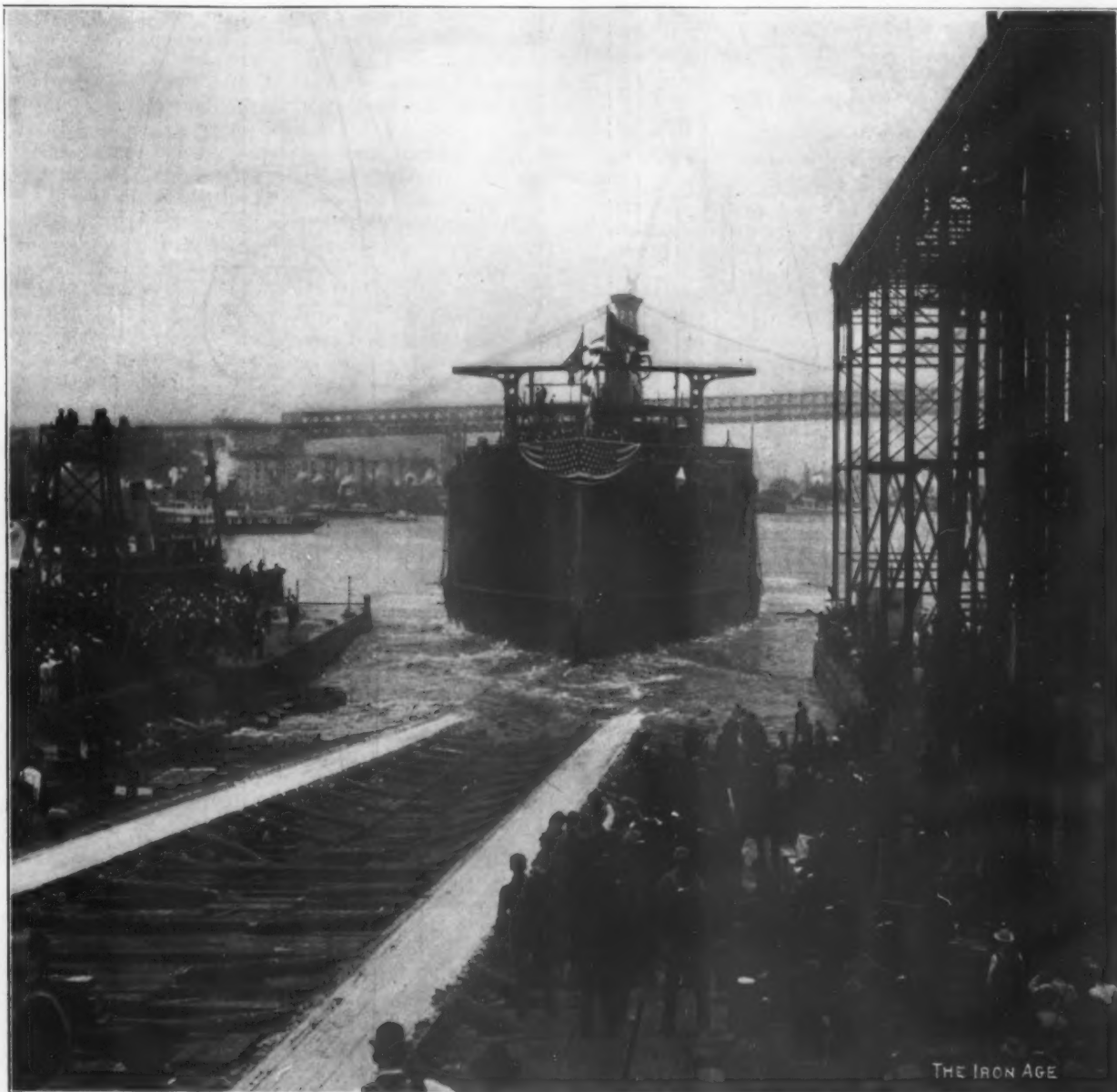
So highly successful was the launching last Thursday that the work of the naval constructors is highly commended. Every detail was figured down to a nicety, and the perfection of these details is attested by the success. Several innovations in launching as compared with the usual methods employed on the Atlantic Coast were inaugurated by Assistant Naval Constructor Robinson. One was the employment of sandbags in connection with the keel blocks. These were placed between the blocks directly underneath the keel and the top blocks of the cribbing. When the time finally arrived for the cutting of the shoe pieces, releasing the ship on her cradle from the shore anchorages, these bags were cut, and as the sand flowed out the keel blocks were easily knocked away. Another feature of interest was the adoption of dog shores for the purpose of holding the vessel in case the shoe pieces, or land anchorages, gave way prematurely. These were heavy timbers fastened to the ground and placed in a diagonal position, with their upper ends pointing toward blocks bolted to the vessel. In case of the vessel starting down the ways prematurely the function of the dog shores would have been to catch it and hold it until arrangements for the launching were completed. An inverted hydraulic jack was placed against the side of the ship near the holding blocks to serve as a means of disengaging the dog shores in the event of their use. The shore pieces held, however, and this provision against emergency was not given a test. To check the progress of the vessel after reaching the water a stout breakwater was fastened to her stern. This consisted of heavily bolted planking forming a sort of bulkhead fastened to

the propeller shafts. The launching was a gala event, witnessed by upward of 35,000 persons within the yards and several times that number stationed at points of vantage on the nearby bridges and buildings.

Description of the Vessel.

Congress, in an act approved July 1, 1902, authorized the construction of two first-class battleships of not more than 16,000 tons displacement, and plans for the "Connecticut" and "Louisiana" were approved by the Secre-

The battery will be mounted as follows: The 12-inch guns in pairs in two electrically controlled, balanced, elliptical turrets on the center line, one forward and one aft, each with an arc of fire of about 270 degrees. The 8-inch guns in pairs in four electrically controlled, balanced, elliptical turrets, two on each beam, at each end of the superstructure. The 7-inch guns in broadside on pedestal mounts on the gun deck behind 7-inch armor, each gun being isolated by splinter bulkheads of nickel



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Fig. 2.—The Launch of the Connecticut Successfully Completed.

tary of the Navy on July 22 of that year. The following is a description of the main features of these vessels:

Length of load water line, feet.....	450
Breadth, extreme, at load water line, feet.....	76 10-12
Displacement on trial, tons, not more than.....	16,000
Mean draft to bottom of keel at trial displacement, feet	24½
Gross draft, full load, feet, about	26¾
Total coal bunker capacity, tons, about.....	2,200
Coal carried on trial, tons.....	900
Feed water carried on trial, tons.....	66
Trial speed at sea for four hours, knots.....	18

The hull is of steel throughout, and will be fitted with docking and bilge keels. The armament is as follows:

Main battery: 4 12-inch breech loading rifles; 8 8-inch breech loading rifles; 12 7-inch breech loading rifles.

Secondary battery: 20 3-inch 14-pounder rapid fire guns; 12 3-pounder semi-automatic guns; 6 1-pounder automatic guns; 2 1-pounder semi-automatic guns; 2 3-inch field pieces; 2 machine guns, caliber 0.30; 6 automatic guns, caliber 0.30; 4 torpedo tubes, submerged.

steel of from 1½ to 2 inches thickness; forward and after guns arranged to fire right ahead and right astern, respectively; other 7-inch guns to have the usual broadside train; the guns of the secondary battery, in commanding positions, having a large arc of unobstructed fire, and protected wherever practicable. All the 7-inch guns are so arranged that their muzzles train inside the line of the side armor, thus leaving a clear and unobstructed side when it is desired to go alongside a pier or vessel.

Armor and Similar Protection.—The hull is protected at the water line by a complete belt of armor 9 feet 3 inches wide, having a maximum thickness of 11 inches for about 200 feet amidships. Forward and aft of this the maximum thickness is 9 inches within the limits of magazines, from which points the thickness is gradually decreased to 4 inches at the stem and stern. The lower casemate armor extends to the limits of the magazine spaces and reaches from the top of the water line belt

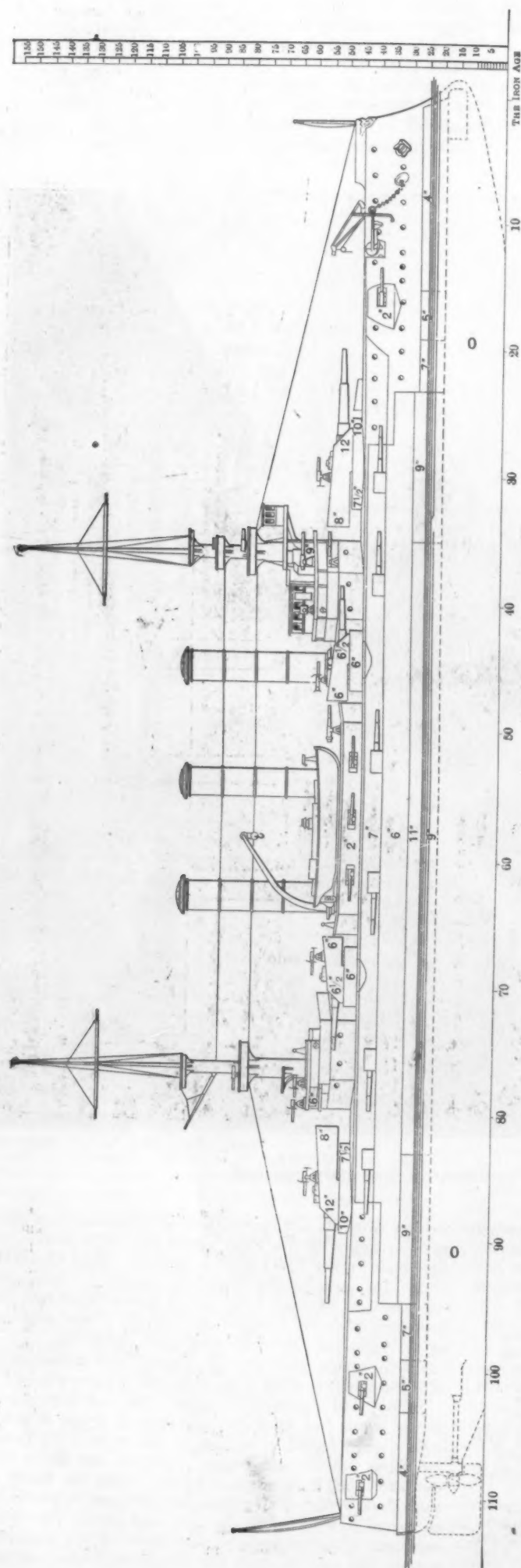


Fig. 3—Outboard Profile.

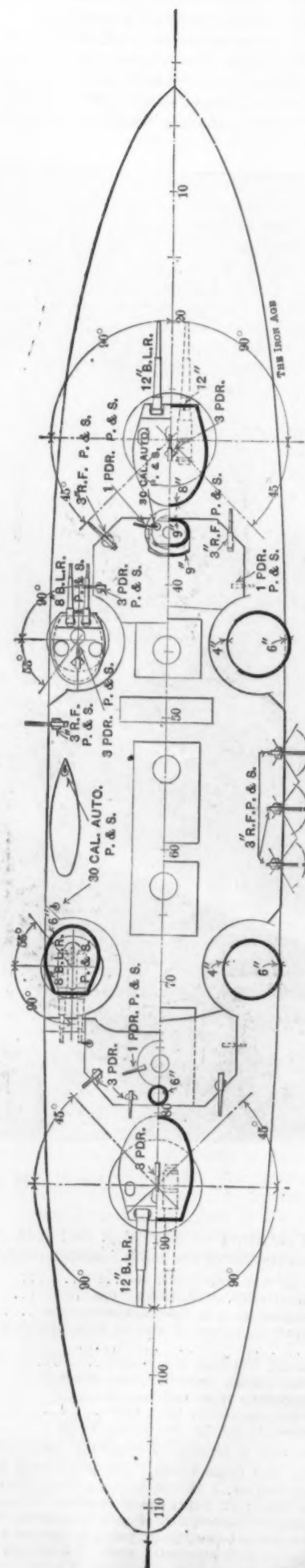


Fig. 4.—Bridge, Upper and Main Decks.

to the lower edge of the 7-inch gun ports on the main deck, and is 6 inches in thickness, the athwartship bulk-

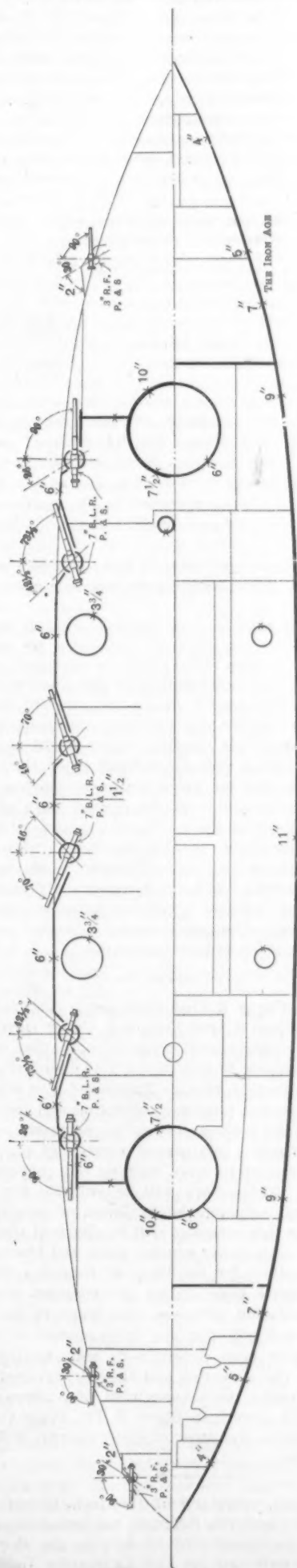


Fig. 5.—Gun and Berth Decks.

heads at the end of this casemate also being 6 inches thick. The casemate armor around the 7-inch guns on

the gun deck is 7 inches thick, and the splinter bulkheads are from 1 1/2 to 2 inches thick. The protection of 3-inch guns is nickel steel 2 inches thick. The upper casemate athwartship armor extending from the shell plating to the 12-inch barbettes is to be 7 inches thick throughout.

The 12-inch barbettes extend from the protective deck to about 4 feet above the main deck and consist of 10 inches of armor in front and 7 1/2 inches in the rear above the gun deck. Between the gun deck and the protective deck there will be a uniform thickness of 6 inches. The barbettes will not have any special framing, the connection of the armor to the decks being sufficient. The 12-inch turrets will have a front plate 12 inches thick, rear plates 8 inches thick, and top plates 2 1/2 inches thick. The 8-inch barbettes will be 6 inches thick in front and 4

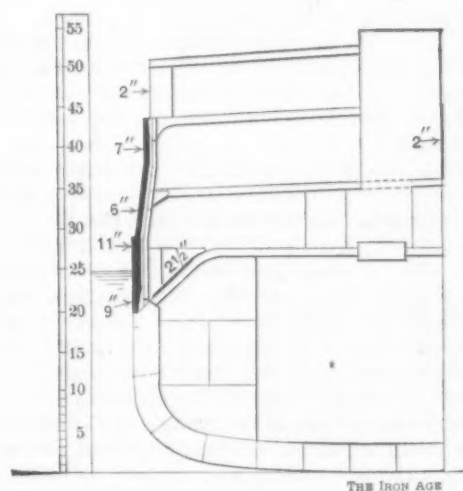


Fig. 6.—Midship Section.

inches thick in rear, with the upper tube 3 3/4 inches thick and the lower tube 3 inches thick. The 8-inch turret front plate will be 6 1/2 inches thick, the rear plate 6 inches, and the top plates 2 inches thick.

The conning tower and shield will each be 9 inches thick, and the signal tower 6 inches thick. An armor tube 36 inches in diameter will extend from the base of the conning tower to the protective deck, and will be 6 inches thick throughout.

Teak backing of a minimum thickness of 3 inches will be fitted behind all side, athwartship and 12-inch turret armor; 2 inches of backing to be fitted behind the 8-inch turret armor; other armor will be fitted without backing.

Protective Deck.—There is a complete protective deck extending from stem to stern, the deck being flat amidships, but sloped at the sides throughout and sloped at each end. It will be built up of 20-pound plating throughout, with nickel steel of 40 pounds on the flat and of 100 pounds on the slopes.

Ammunition.—The magazines and shell rooms are so arranged that about one-half the total supply of ammunition will be carried at each end of the ship. Magazine bulkheads adjacent to heated compartments, such as fire rooms, engine rooms and dynamo rooms, are arranged with air spaces. The ammunition for 7-inch and smaller guns will be conveyed by hoists directly from the ammunition rooms or ammunition passages to the deck on which it is required, or as near that as possible. These hoists will be driven at constant speed by an electric motor, and will be arranged to deliver seven pieces per hoist per minute. The turret guns have regular turret ammunition hoists, operated by electric power; these hoists leading directly from the handling rooms or the ammunition passages to the turrets. For transporting 12-inch, 8-inch and 7-inch ammunition, trolleys and tracks will be fitted in handling rooms, passages and shell rooms. All of these hoists and all similar equipment which can so be made will be constructed on an interchangeable system, so that any removable apparatus can be quickly taken from one ship and fitted to any other ship of her class. The advantage of this system in action is apparent, as in the partial disablement of two or more vessels there will be a chance of gathering enough of the equipment re-

maintaining intact to speedily refit one vessel for resuming service.

Propelling Machinery.—The engines will be of the vertical twin screw, four cylinder, triple expansion type, of a combined indicated horse-power of 16,500. The steam pressure will be 250 pounds. The stroke will be 4 feet. The ratio of high pressure to low pressure cylinder will be at least 1 to 7, and the diameters will be sufficient for the required indicated horse-power at about 120 revolutions per minute. Each engine will be located in a separate water tight compartment. There will be 12 Babcock & Wilcox boilers, placed in six water tight compartments. They will have at least 1100 square feet of grate and 46,750 square feet of heating surface. There will be three funnels, each 100 feet high above the base line. The weight of all machinery and tools, stores and spare parts will be about 1500 tons.

The vessel will be lighted throughout by electricity. The electric plant will consist of eight 100-kw. steam driven generating sets, all to be of 125 volts pressure at the terminals, disposed in two separate and independent dynamo rooms.

All main compartments of the ship below the gun deck except the coal bunkers are to be provided with forced ventilation, there being no less than 33 blowers, with a combined capacity of not less than 104,000 cubic feet per minute. Special attention has been given to spaces subject to habitually high temperatures, such as engine rooms, fire room and dynamo rooms. The ventilation system will be designed to cut the minimum number of water tight bulkheads. All blowers, except forced draft blowers, are to be electrically operated.

The coal bunkers are to be arranged with satisfactory reference to the rapid and efficient supply of coal to the fire rooms and have a maximum capacity of about 2300 tons. There are to be provided for coaling not less than six winches, 12 booms and all necessary fixed chutes, scuttles, hatches and other openings.

The following boats will be carried, adequate provision being made for their convenient stowage and handling, two electrically operated boat cranes, eight pairs of boat davits, adjustable boat chocks and necessary fittings being provided for this purpose: One 50-foot steam cutter, two 36-foot steam cutters, one 36-foot steam launch, three 33-foot launches, five 30-foot cutters, two 30-foot whaleboats, one 30-foot gig whaleboat, one 30-foot barge, two 20-foot dingies, one 16-foot dingey, one 14-foot dingey and two life rafts.

Machine Shop.—A feature of interest will be an unusually well equipped workshop containing the following machine tools of approved design, with proper line and countershafting (the former to be run by electric motor) and all necessary and usual spare parts and tools:

One screw cutting back geared extension gap lathe, to swing 28 inches over the upper ways and 48 inches over the lower ways, and to take between centers 8 feet closed and 16 feet extended.

One 14-inch screw cutting back geared lathe, to have an 8-foot bed.

One column shaping machine of about 15 inches stroke and about 26 inches traverse.

One back geared vertical drill press, to drill up to 1½ inches in steel, 18 inches from edge of work, with at least 15 inches traverse of spindle.

One 16-inch sensitive drill.

One universal milling machine, with at least 20-inch table feed, 6-inch cross feed and 17-inch vertical feed.

One combined hand punch and shears, with 6-inch shear blades, capable of cutting ¾-inch round iron, shearing ¾-inch steel plates, and punching ¾-inch holes in ¾-inch mild steel plates.

One emery grinder with two wheels 12 inches in diameter and 2-inch face.

One 30-inch grindstone.

Six bench vices.

The vessel is designed as a flagship, and the arrangement of quarters provides ample accommodations for the following complement: A flag officer, a commanding officer, a chief of staff, 19 wardroom officers, 10 junior officers, 10 warrant officers, and not less than 761 men, including 60 marines.

Plans and specifications for the "Connecticut" were forwarded to the navy yard with authority to begin the construction of the vessel on August 11, 1902. Advertisements for the steel material to be used in the con-

struction of the hull were issued by the Department, and contracts were awarded on September 12 for a total of 7466 tons at a cost of \$462,691.87. The provisions of specifications and the terms of the contract for this material have been made in such a manner as absolutely to insure the obtaining of this material at as low a price as that at which it will be supplied to private shipbuilders for the same class of vessels. The following is a synopsis of the awards, giving the number of the class, number of tons, name of article and to whom awarded, cost per pound and total cost:

1.	4,206 ship plates, Carnegie Steel Company.	\$0.019	\$179,007.36
2.	987 nickel steel plates, Carnegie Steel Company .....	.0715	158,077.92
3.	1,825 miscellaneous ship shapes,* Carnegie Steel Company .....	.019	78,489.60
4.	198 steel castings, United States Steel Company .....	.0695 } .0648 }	27,763.39
5.	Miscellaneous hull rivets, American Iron & Steel Mfg. Company .....	.031 } .060 }	19,353.60

* ¼ cent per pound allowed extra for cambered channels.

The limit of cost, exclusive of armor, was in the case of both vessels \$4,212,000. The "Louisiana" was contracted for by the Newport News Shipbuilding & Dry Dock Company, Newport News, Va., on October 15, 1902, for \$3,990,000, to be constructed in 41 months, and to be delivered complete and ready for sea by March 15, 1906.

This authorized cost has, in the case of the "Connecticut," been allotted among the bureaus concerned as follows:

Construction and repair	\$2,852,000
Steam engineering	1,100,000
Equipment	260,000

The rate of speed maintained in her construction and that of the "Louisiana" up to the present time has never been equaled for war ships in America, except by ships begun since their starting, which might reasonably be construed to mean that she and her sister, the "Louisiana," had set a pace for American naval construction.

The "Connecticut" is of the largest class of battle-ships in the American Navy. There are now, of her size, five under construction: the "Connecticut," "Louisiana," "Kansas," "Minnesota" and "Vermont." She compares most favorably with the largest and latest designed vessels of foreign navies, a recent tabular comparison putting her down as superior to any vessel of any other navy either afloat or under construction.

The Dover Forge & Iron Company.—The new plant of the Dover Forge & Iron Company, Canal Dover, Ohio, is now in its experimental stage of operation and will probably be running to full capacity in two weeks. The output will consist of genuine hammered iron sheet bars or slabs for special purposes, also charcoal iron sheets and tin plate bars made according to customers' specifications, either from a mixture of scrap and pig iron or charcoal pig iron exclusively, nothing but charcoal being used as fuel. These bars will be suitable for tinning or galvanizing. Among the varieties of semiraw material made by this company will be charcoal iron billets from 2 inches to 6 inches square, slabs and blooms in required sizes either for rerolling or forging. The company has entered some orders for common iron sheet bars for corrugating purposes, also some of the higher grades, but is not soliciting any large amount of business until costs have been determined and quality found satisfactory. The operating and sales departments of the company are under the management of Ambrose Beard, formerly of the American Sheet & Tin Plate Company. Joseph A. Krantz, treasurer of the company, will act as purchasing agent.

H. de Nimal, secretary of the Iron Manufacturers' Association of Charleroi, Belgium, has issued in pamphlet form an article contributed by him to the *Revue Economique Internationale* on the "Firearms Industry of Belgium." The paper is largely statistical and commercial.

The Practical Handling of High Speed Steels.

It is now quite evident that high speed steel is to be an important factor in economic production, and that it has therefore come to stay; not necessarily in the imperfect state of to-day, but rather with many, if not most, of its defects eliminated. For it certainly has defects, some of them so great as to discourage its general adoption for ordinary use. The manufacturers are well aware of this and are giving evidence of it by their constant efforts to improve the composition so as to get better results and fewer defects, at the same time increasing the stock of knowledge of its nature and behavior. My judgment is that, while there certainly are serious shortcomings and difficulties that seem inherent in the nature of alloys and the materials upon which they are to work, most of the failures to get good results, and most of the defects, are due to an imperfect understanding of the properties and necessary methods of treatment of the new steel alloys.

Of course the seller gives to the purchaser general, and sometimes explicit, directions as to the methods of treating the steel; but in fact those who work it up usually pay little attention to directions, preferring to depend upon their knowledge of the properties of ordinary steel, or carry the directions out imperfectly. If high speed steel is treated intelligently, and by smiths who have gained some experience in handling it, satisfactory results will certainly follow. We have experimented for over two years with the new steels, testing in that time practically all brands and makes on the market. Possibly a recital of some of our experiences would prove of value to others.

Of the defects common to most makes, perhaps the occurrence of flaws and hard streaks is most frequent. Even the best yet produced will develop flaws, and no amount of annealing entirely takes out all hard spots. Its extreme hardness and its exceeding brittleness are the chief difficulties in using high speed steel. Finding after a few experiments that it lacked the toughness of ordinary tool steel and that it required an entirely different treatment, many a user has continued to use the old tool steel where a high speed steel would really, had there been more experience, have demonstrated its superiority in working and in greater economy. Right here is the crux of the situation. The question of brittleness or toughness is almost wholly a question of treatment. A properly treated tool of rapid cutting steel will stand up under any proper condition of work, and will ordinarily do anything that can be reasonably expected of it. But proper treatment is a matter of experience, almost wholly.

A tool dresser may be ever so expert in handling common tool steels, and yet fail utterly with the new steels. The fact is, he cannot depend upon his knowledge of ordinary steels for assistance in working up high speed tools. He must learn an entirely new set of properties and must be governed by an entirely different set of color values. The fitness of an alloy steel tool does not depend upon its being too hard for the file. In fact, with some makes the best results are obtained from a tool soft enough to take a good file; with others again, a similar degree of softness, or even much less, would result in a "gumming up" of reamers, drills, or other tools where there is friction when working, and rapid burning out of the tool. Experience alone will determine just what is most satisfactory for any particular make. We can, however, lay down a few general principles applicable to most of the rapid cutting steels.

Heating the Steel.

The small lathe tool, broken directly from the bar and set in a tool holder, of course needs no further treatment than simply grinding to the required nose. After forging, or brazing to an inexpensive metal, however, it requires careful rehardening; and upon doing this properly and upon the subsequent annealing depends the value of the tool. We find that best results are obtained, particularly in the case of large or closely sized tools, when they are heated packed, and in a closed gas furnace. The tools are placed in a pipe or box, packed with

small pieces of coke, and sealed up with fire clay. Holes must be left for the escape of gases, or the sealing will otherwise blow out. According to size the case is heated three to four hours in a furnace previously raised to a white heat, at the end of which time the packing is quickly removed and the tools plunged into the bath. The latter should be very near at hand, so that there is the least possible exposure of the tool to the air after removal from the packing case and the enveloping gases, because such exposure causes oxidation and consequently affects the size, and also the evenness of the tempering.

Hardening.

The quickness with which the tools can be handled, and therefore the accuracy of the hardening, depends largely upon the method of packing; and this, in turn, depends somewhat upon the shape of the tool and its size. They should be so packed as to permit the free circulation of gases, and of the bath oil if they are all plunged simultaneously, as they should be to get even results. Milling cutters and others that can be so placed may be suspended from a bar, each separated from the next by a little space. The rod can then be quickly removed with the tools and plunged into the fish oil bath. It is important that the precaution of separating the pieces sufficiently to allow the oil to come in contact with the whole surface be not overlooked; otherwise there will certainly be a number of cracked or flawed pieces, the unequal cooling setting up internal strains. Sometimes the crack does not appear until the tool has been some time at work. We had some expensive experience along this line.

The bath should be of fish oil, placed convenient to the furnace, and if much hardening is to be done, should be arranged so as to permit keeping the oil uniformly cool. This is accomplished by using a double tank, the oil tank being jacketed by flowing water. Allowing air to bubble up from the bottom also assists in keeping the temperature uniform.

It may be asked, Why not harden the tools in air, as is recommended by some makers? A reason has already been given: that it causes oxidation and therefore affects the size of a tool, and this is to be avoided in the case of accurately sized tools. Aside from this, as good results can be had with air as a hardening agent as with oil.

Drawing Alloy Steels.

High speed tools hardened as above are quite likely to be too brittle and hard for some uses. Drills, taps and other cutters with small cutting edges are almost sure to be so, with the result that after a little dulling the edge breaks down. This can be avoided by annealing or drawing. But drawing alloy steel tools is a very different thing from drawing carbon steel ones. There is an entirely different series of color values that must be used—if, indeed, it is safe to depend upon the eye at all. The safest method is to use an accurate temperature gauge and a systematic record of heats found to be satisfactory for particular jobs. Only in some such way can uniformity be maintained. But where this is not possible, of course, it is necessary to depend upon the experienced eye. Only experience will give the required skill and judgment for that, so about all that can be said further is that the blue heat sufficient for carbon steel is wholly insufficient for high speed steel. The heating must be carried along until a greenish tinge, varying somewhat, for different classes of work, is reached. The tool is then allowed to cool in air, as usual. If it is found to require further softening and toughening, this may be done by reheating to a faint red just perceptible in the dark. We use a nail keg to get the dark place. It is then cooled as before and will stand up to any reasonable requirement.

The comparatively very high cost of the new steel makes it often questionable if it pays to use it in large tools. In practically all small cutting tools there is no such question. In the case of large reamers and millers the saving, if any, is in many jobs very slight. We no longer attempt to make such tools of high speed steel. We make the cutters of it, and insert them in properly formed holders made of the cheapest material that will stand up under the work required. The result is that

we actually make these large tools (not in all cases, however) cheaper than it was possible to make them of good tool steel. We are, therefore, getting from three to ten times the work we formerly got from such a tool made of carbon steel at a cost actually less. W. B.

Reduced Wages in Tin Plate Plants.—At the National Works of the American Sheet & Tin Plate Company, Monessen, Pa., the tonnage men in the hot mills have signed a new scale, effective October 1, which provides for a reduction of about 12½ cents in wages. At New Kensington, Pa., the company has two tin plate plants, known as the Pittsburgh Works and the Pennsylvania Works. Both have been idle for some time, but recently the former employees of both plants signed a petition agreeing to work at the same rate of wages as is now paid in the company's Demmler Works, and also agreed to work under the same conditions as prevail in those works. This means that both the Pennsylvania

The Standard Wieland Four-Inch Pipe Threading and Cutting Machine.

An all-gear speed-changing mechanism is the distinguishing feature of the Standard Wieland 4-inch pipe threading and cutting machine shown in the accompanying engravings. It is a design of the Standard Engineering Company, Ellwood City, Pa., which claims for it a considerable saving in time ordinarily lost in shifting belts, and an advantage in that the driving belt is never touched by the operator's oily hands, hence maintains its maximum driving power for a longer time. There is also greater safety in handling the machine, as there is no occasion for the operator to have his fingers or clothing entangled. The machine has a pleasing outline, the bed being cast in one piece, without legs or standards, which offers the strongest possible construction. All journal boxes are a part of this bed casting.

The die operating mechanism is the same as that de-

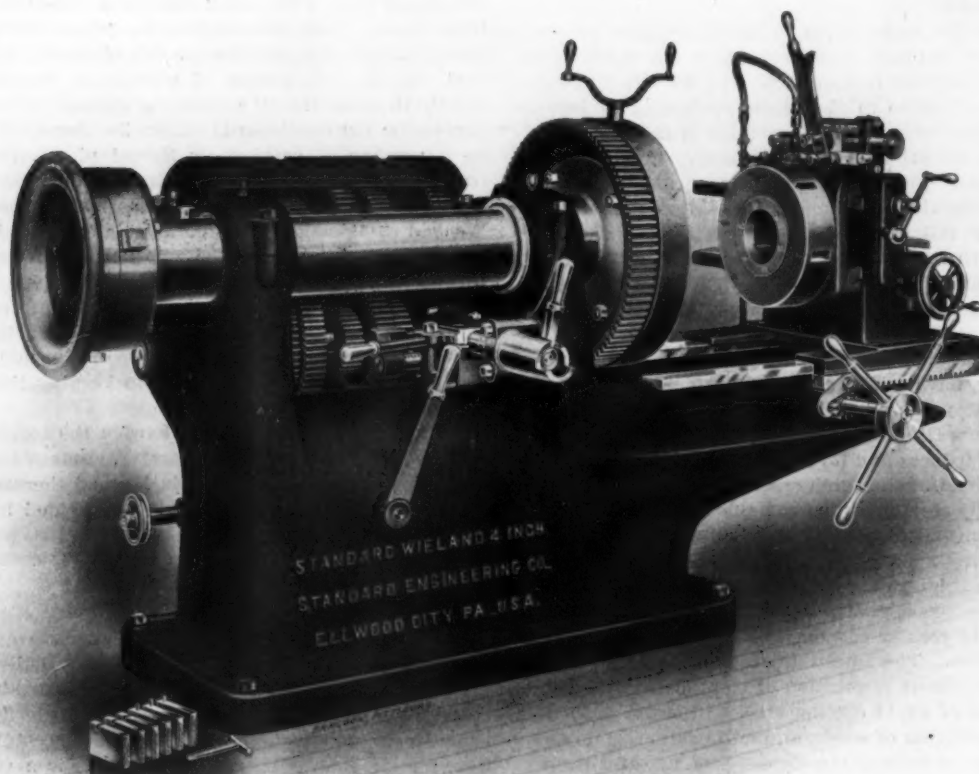


Fig. 1.—Working Side of the Standard Wieland 4-Inch Pipe Threading and Cutting Machine.

and Pittsburgh Works will in the future be operated non-union, the employees having surrendered their charters in the Amalgamated Association. At the present time only a very few tin plate plants of the American Sheet & Tin Plate Company are operated as union mills.

The removal of sleet from the third rail of an electric traction system, by raising its temperature electrically, has been attempted in experiments recently made by Wm. Grunow, Jr., W. T. Oviatt and R. B. Davis of the Connecticut Railway & Lighting Company, as described in the *Street Railway Journal* of recent date. It is stated that a 70 pound T-rail, 30 feet long, was heated by a wire carried under the head of the rail and insulated from it by porcelain bushings. Wooden guards were used to protect the rail from wind. With the surrounding air at 15 degrees F., the rail was raised 19 degrees in temperature in 15 minutes, and the same amount in 12 minutes with the surrounding air at a temperature of 21 degrees.

scribed in *The Iron Age* of January 7, 1904, for the Standard Wieland 6-inch machine. Its description will not be repeated at this time more than to say in a general way that it is the only straight line lever device made. The dies are opened and closed by means of the vertical lever seen in Fig. 1, at the right. The adjusting of the dies to cut a prescribed depth is regulated through the knurled knob just above the ball handle for the cross slide. The peculiar arc shaped fin on the opening and closing lever rides on a rest and automatically centers the lever and link connecting with the cam ring, in a straight line at all points of adjustment. It will be noticed that the dies are mounted on the cross slide, so that the entire mechanism may be moved to one side while removing a pipe or cutting off the end, to avoid injury to the dies by dragging the pipe over them. The cutting-off tool is mounted in a lathe type of tool post, and may be turned at an angle to remove burrs from the end of the pipe prior to threading.

The new feature on which most emphasis is to be laid is in the speed-changing mechanism. This is shown

in more detail in Figs. 2 and 3. Fig 2 is taken from a photograph of the head, with the spindle removed to better show the gearing. Fig. 3 is a sectional elevation of the gearing, showing the driving shaft and back shaft, but not the spindle. In both figures the same letters refer to the same parts. Gears A and C are in one piece, which is extended, forming a quill shaft, to the outer end of which the driving pulley is keyed. These members revolve freely on a solid shaft, to which the gears H, F and M are keyed. Gear L is mounted loosely on the shaft and is inoperative except when meshing with gear K and engaged with the clutch gear H. It is operated through lever 4. The gears B, D, G, K and E all slide upon a feather upon the back shaft. Gears B and D are connected together and may be shifted on the shaft by the lever 1, so as to intermesh B with A, or D with C.

pipe and the slowest for the largest. The fastest speed of the spindle is obtained with the gears A and B in mesh, as shown in Fig. 2, the lever 1 being in position there indicated, and the gears K and L in mesh. For this combination the lever 2 is vertical and the lever 3 is drawn forward to clutch gears L and H. Motion is transmitted to the spindle for all combinations through the gear M engaging with a gear, N, on the back of the chuck on the spindle. The arrangement just described is that used for working 1-inch pipe. For working 1½-inch pipe gears K and L remain in action as before, but the gear D is engaged with C by moving the lever 1 to the right. For cutting 2-inch pipe A and B are again engaged by returning the lever 1 to its left hand position, and the gears E and F are engaged by throwing the lever 2 to its left hand horizontal position. It is im-

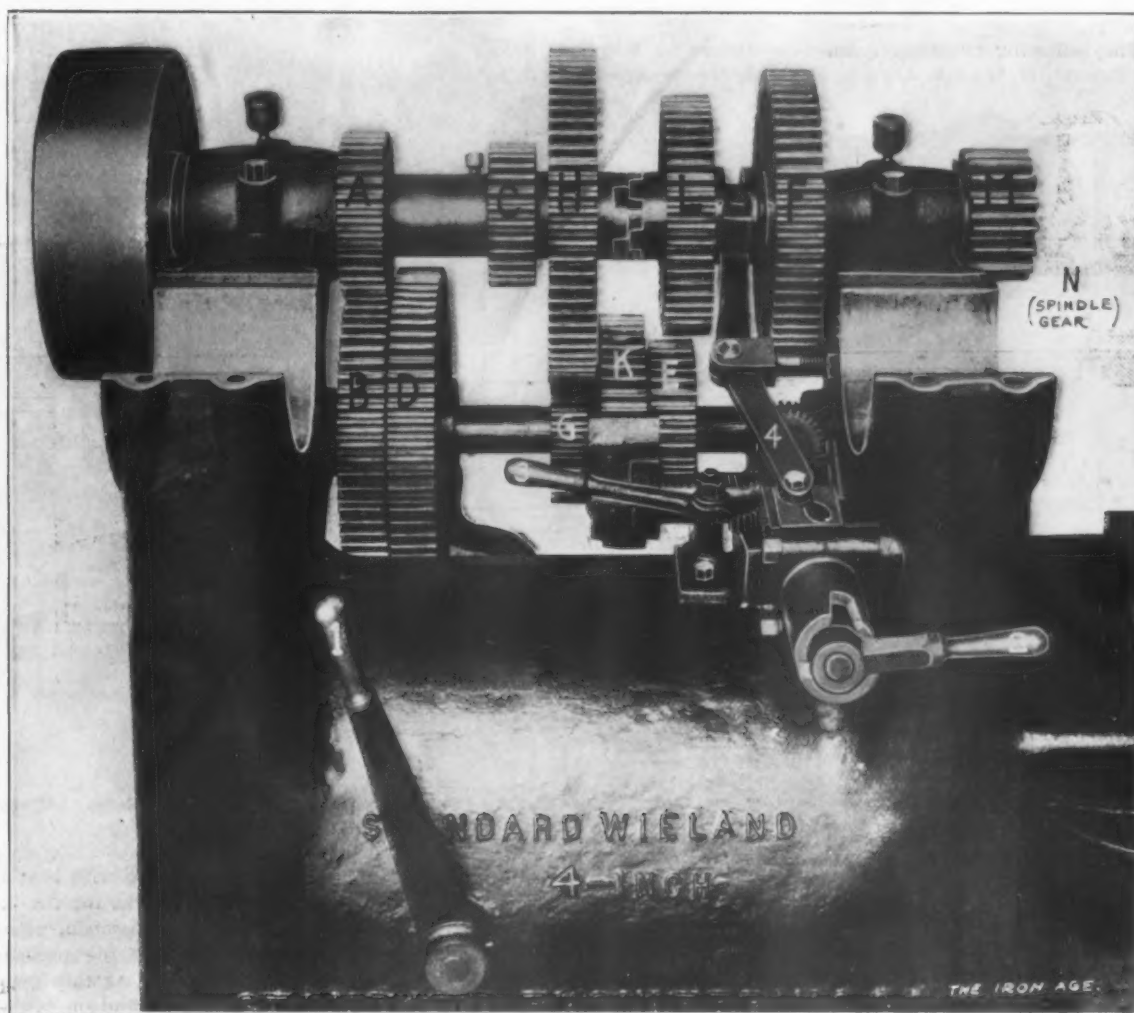


Fig. 2.—A View of the Head with the Main Spindle Removed to Show the Gearing

Gears G, K and E are similarly connected together, and are shifted by means of a yoke and rack engaging with a spur gear connected with the handle 2. This handle causes the gear G to be intermeshed with H, or K with L, or E with F. With the lever 2 in its vertical position, the lever 3 is free to slide a cam block by means of a sector gear and rack, so that the lever 4 throws the clutch gear L into engagement with the clutch gear H, thereby connecting L to the solid shaft to which M is keyed. It is interesting to note that the gears may all be engaged or disengaged while the driving shaft is running. The speeds are sufficiently slow for all combinations, except those in which K and L are in action, so that they may be thrown into mesh without danger. The clutch provision for the gear L makes it possible to throw in the fastest speeds, in which that gear is used, without stopping the driving shaft.

It will be seen that there are six combinations. The fastest is naturally used for the smallest diameters of

possible to do this without first withdrawing the lever 2 from a notch in its bearing, which disengages the clutch gear L from H. The fourth speed, for cutting 2½-inch pipe, merely requires the throwing of lever 1 to engage gears C and D, E and F remaining in action as before. For 3-inch pipe A and B are again engaged, and G and H by throwing the lever 2 to its extreme right hand position. This combination is shown in Fig. 2. The slowest speed, for 4-inch pipe, uses the same arrangement, but with C and D engaged instead of A and B.

The countershaft furnished with this machine is of the friction clutch type instead of the shifting belt, which has been discarded on account of its slow acting and cumbersome pulleys. It is believed that the output of the machine is very materially increased by using a friction countershaft. The countershaft is designed to run at 200 revolutions per minute.

A rotary pump, attached to the rear of the machine near the head, as shown in Fig. 4, delivers oil to both the

die head and the cutting-off tool. It is driven by a round belt connecting with a grooved pulley formed on the hub of the driving pulley. The pump is, therefore, in operation, supplying oil to the tools only when the machine is running. The stock is held in the machine in a gripping chuck of universal type located at the front of the spindle or barrel. The scroll chuck, at the rear of the spindle, is used only for centering the pipe. The machine is regularly furnished with chasers, six to the set, for 1, 1½, 1¾, 2, 2½, 3, 3½ and 4 inch pipe. It may be had with either United States Standard or Whitworth Standard chasers. The machine occupies a floor space of 46 x 105 inches, and weighs about 4000 pounds. Engine or motor drive is arranged for if required.

The Iron and Steel Institute's American Programme.

The following programme has been issued by Secretary Bennett H. Brough, London, England, for the American

meeting of the Iron and Steel Institute, to be held in New York on Monday, October 24, and Wednesday, October 26, 1904:

in New York on Friday, Saturday and Sunday, October 21, 22 and 23. The headquarters will be at the Hotel Astor, at Forty-fourth street and Broadway. For the entertainment of the members during their three days' stay in New York a Reception Committee has been formed, including the following gentlemen: James A. Burden, chairman; G. W. Maynard, vice-chairman; Stephen W. Baldwin, chairman Finance Committee; L. W. Francis, chairman Invitation Committee; C. A. Moore, chairman Reception Committee; E. E. Olcott, chairman Transportation Committee; Thos. Robins, Jr., chairman Entertainment Committee; T. C. Martin, chairman Banquet Committee, and Dr. R. G. Moldenke, secretary.

The New York committee has arranged for optional excursions on October 24 to power houses, bridges, industrial establishments, universities, the navy yard, subway,

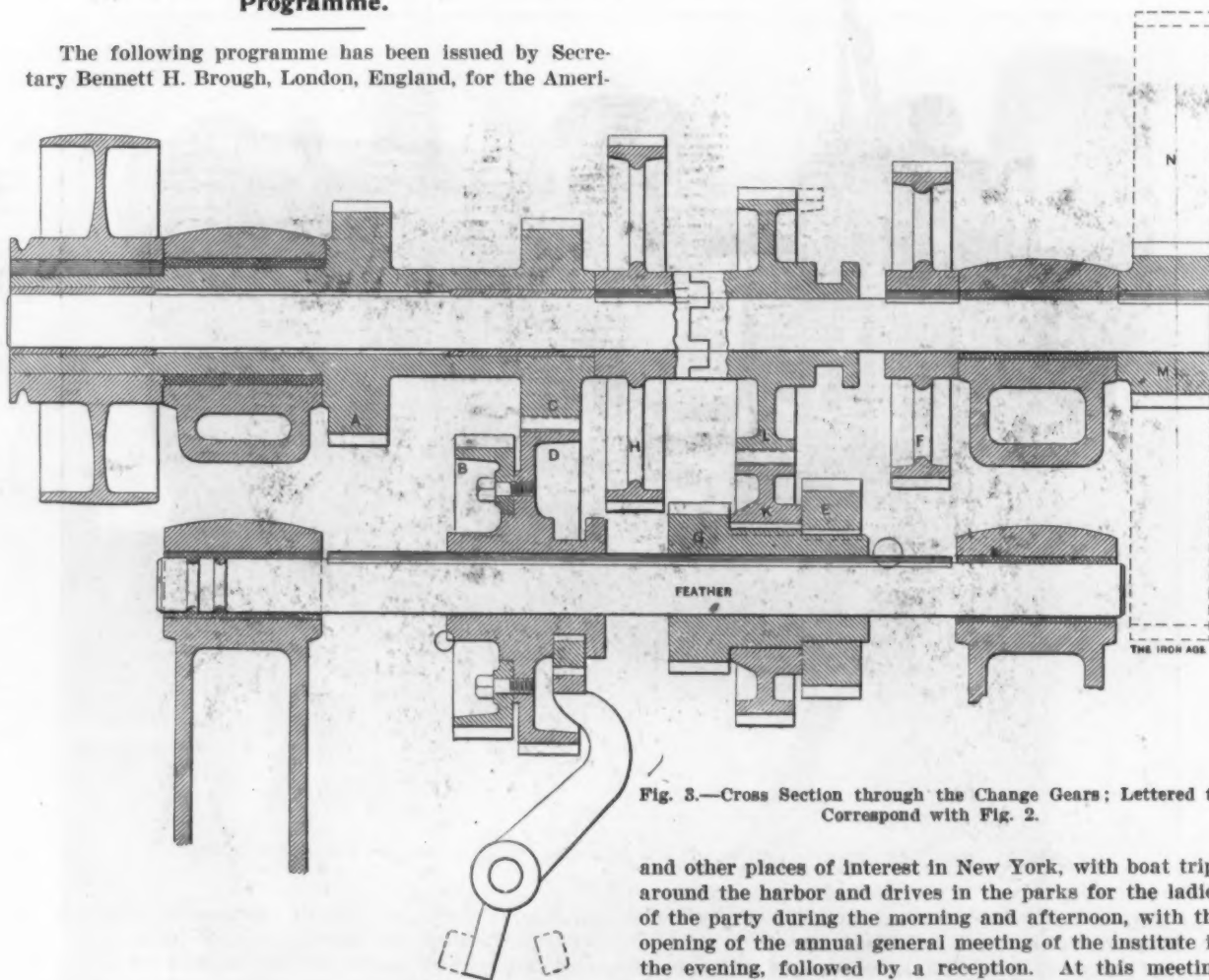


Fig. 3.—Cross Section through the Change Gears; Lettered to Correspond with Fig. 2.

can meeting of the Iron and Steel Institute, to be held in New York on Monday, October 24, and Wednesday, October 26, 1904:

The following papers have been offered for reading: "Iron and Steel at the St. Louis Exposition," by Professor H. Bauerman, member of the International Jury; "A West African Smelting House," by C. V. Bellamy, Director of Public Works, Lagos, with an appendix by F. W. Harbord; "The Influence of Carbon and Phosphorus Upon the Strength of Iron and Steel," by H. H. Campbell, Steelton, Pa.; "The Rateau Low Pressure Turbine at Steel Works and Collieries," by E. Demenge, Paris; "A Dry Air Blast Apparatus," by James Gayley, president of the American Institute of Mining Engineers, New York; "High Speed Tool Steels," by J. M. Gledhill, Manchester; "The Determination of Carbon and Phosphorus in Steel," by Baron H. Jüptner von Jonstorff, Vienna; Andrew A. Blair, Philadelphia; Gunhar Dillner, Stockholm, and J. E. Stead, Middlesbrough; "Acid Open Hearth Manipulation," by Andrew McWilliam and W. H. Hatfield, Sheffield; "A Power Gas Plant for Johannesburg," by P. J. Mallmann, London.

It is expected that most of the members will arrive

and other places of interest in New York, with boat trips around the harbor and drives in the parks for the ladies of the party during the morning and afternoon, with the opening of the annual general meeting of the institute in the evening, followed by a reception. At this meeting addresses of welcome will be delivered, and on behalf of the council Sir James Kitson, past president, will present to the president, Andrew Carnegie, the Bessemer gold medal in recognition of his great services to the iron and steel trades of the world.

The daylight hours of October 25 will be devoted to an excursion up the Hudson River on a specially chartered Albany boat, stopping at West Point, where the United States Military Academy is situated.

In the morning and afternoon of October 26 there will be two meetings of the institute, when a selection of papers will be read and discussed. In the evening the institute will entertain the Reception Committee at dinner at the Waldorf-Astoria. For this evening a theatre party is to be arranged for the ladies accompanying members.

The party will leave New York October 27 at 8.55 in the morning, for Philadelphia, arriving at 11.20 a.m. Members wishing to visit the Bethlehem steel plant will start about 8.45 a.m., and reach Philadelphia later in the afternoon.

Special trains will leave Philadelphia October 29 at 9.30 a.m., arriving at Washington at 1 p.m. A reception will be held in the evening by the President of the United States.

The party will leave Washington October 31 at 8.30 a.m., arriving at Cumberland at 12.30 p.m. for luncheon, and at Pittsburgh at 6.30 p.m., in time for evening dinner. November 1 and 2 will be spent in Pittsburgh, where excursions to iron and steel works will be arranged.

The members of the party will leave Pittsburgh November 3 at 2 p. m. for Cleveland, arriving at Cleveland at 5.30 p.m. For the entertainment of the members in Cleveland a Reception Committee has been formed with S. T. Wellman as chairman and A. I. Findley as secretary.

The party will leave Cleveland November 5 at 4 p. m., and arrive at Buffalo at 8.30 p.m., spending the night and Sunday there. Those who wish to stop at Albany to visit the General Electric Company's plant can do so, both parties arriving in New York on the evening of Tuesday, November 8, in time for the steamer leaving

the morning of November 12, in time to reach the steamer that sails for England that morning.

For the reception of the institute during its stay in America an influential committee has been formed, John Fritz, Bessemer gold medallist of the Iron and Steel Institute, being the president; Charles Kirchhoff, the chairman of the Executive Committee; Robert E. Jennings, treasurer, and Theodore Dwight, secretary.

The Animas Canal, Reservoir, Water & Investment Company, incorporated under the laws of Colorado, has acquired water rights in a drainage area of 400 square miles in San Juan and La Plata counties. This drainage area is inclosed toward the center, where flows the Animas River. This river, between Silverton and Durango, has a gradual fall of nearly 3000 feet, most of it within 20 miles. The problem was to use a portion

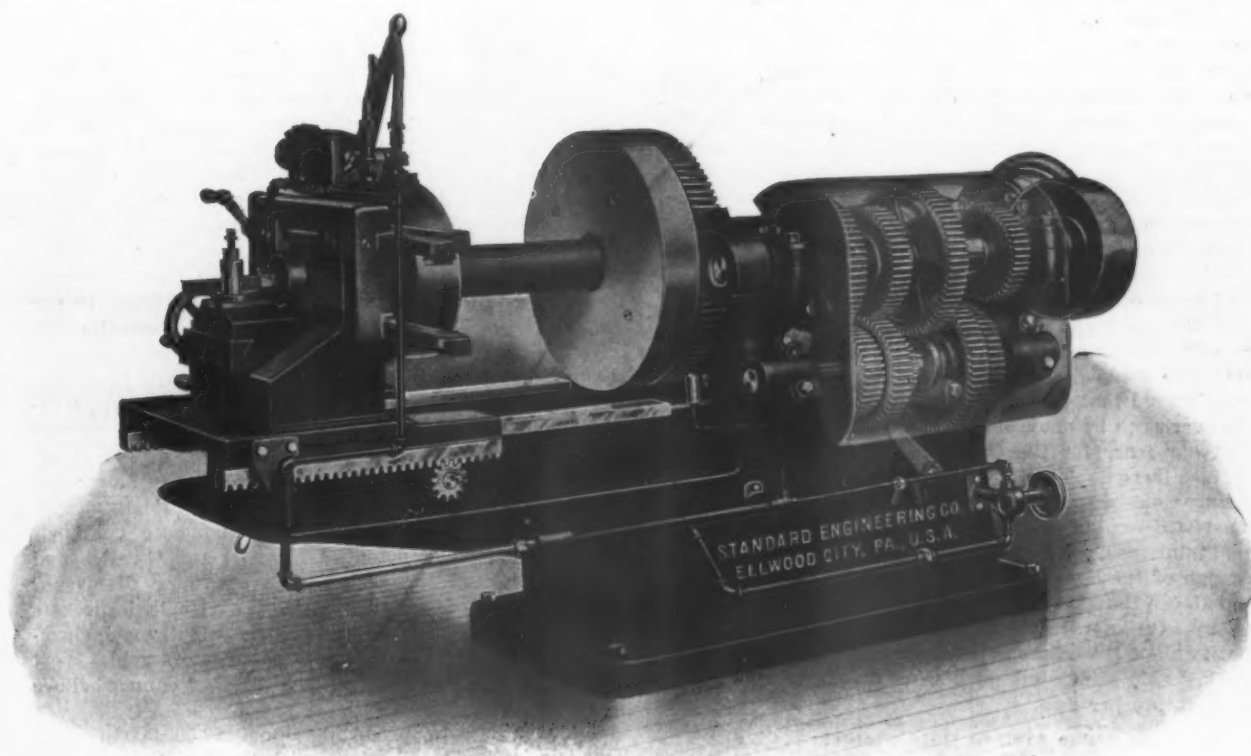


Fig. 4.—Rear View, Showing Cutting Off Tool Removing the Burr from the Cut End of a Pipe.

for England on Wednesday, November 9. On November 7 the party will be taken to Niagara Falls.

The party will leave Buffalo November 8 at 8 a.m. for Syracuse, arriving there at 12 noon, when there will be an hour for luncheon. At 1 p.m. they will leave for Albany, which will be reached at 4 p.m. Those who desire to see the General Electric Company's plant at Schenectady and the American Locomotive Company's works there will have to stay over a day in Albany, making the trip on the following day to Schenectady, leaving there about 6.30 or 7 p.m., and arriving in New York November 9 at 10.30 p.m.

For the convenience of members desirous of visiting the St. Louis Exhibition arrangements will be made for a limited number to leave Pittsburgh on Thursday, November 3, at 8.10 p.m., for St. Louis and Chicago, returning to New York in time for the steamer leaving November 12. This party will reach St. Louis at 1.42 p.m. November 4, spending Saturday and Sunday there, and leaving at 11.40 p.m. November 7 for Chicago. The party will arrive at Chicago at 8.10 a.m. November 8, and leave Chicago at 5 p.m. the following day. They will proceed to Niagara Falls, which will be reached at 7.30 a.m. November 10, and leave the Falls at 8 p.m. November 11 for New York. They will arrive in New York on

of this fall. At a point 10 miles below Silverton the river is dammed and nearly all of its water is diverted to a canal, which follows the line of the river in a south-westerly direction about three miles and then gradually leaves it. For five more miles it proceeds, and then it is joined by another canal, three miles long, which carries the water of Lime Creek from the north. After the junction the canal is carried two miles to what is called Cascade Reservoir. This reservoir is a natural basin, three miles long and about three-quarters of a mile wide, extending North and South. In addition to being fed by the Animas River and Lime Creek it receives another supply from a canal which brings the water of Cascade Creek. This canal is about five miles long. At the southern end of the reservoir is another dam, and over this the water is poured into what is called a power canal, which proceeds southeasterly for two miles and ends in a feed reservoir. This is close by the top of a cliff 1000 feet high. At its base flows what is left of the Animas River. From the feed reservoir down the face of a cliff a riveted steel pipe 4 feet in diameter is being extended. It will withstand the enormous pressure of 900 pounds to the square inch. In the power house the first installation will consist of two large generators each connected with a water wheel.

The Future Supply of Gold.

The London *Economist* for September 17, 1904, published the following article by its special mining commissioner, which is worthy of careful perusal in view of the general belief in a steadily increasing supply of gold:

The world's output of gold this year will be, I suppose, not less than £70,000,000, and is likely to be the greatest on record. Next year it will probably be a little more than this, and the year after still more. But the discovery of new mines is not keeping pace with the exhaustion of those now being worked, and it seems to me that in a few years the output must reach its zenith, and then gradually decline.

It is true that the expansion of the output from the Rand, granted a full supply of cheap labor, will be very great; but against that must be reckoned a probable falling off from many of the other important gold producing centers of the world. Johannesburg is still in the ascendant; but, Kalgoorlie, Cue, Kolar, Ohinemuri, Reefton, Charters Towers, Gympie, Croydon, Bendigo, Ballarat, Rossland, Dawson, Cripple Creek, the Mother lode, the Gwanda, Douglas Island, and Nome, have either reached their maximum of production or are on the actual down-grade. If we project our imagination five years ahead, we see quite a serious falling off in the gold yield of many countries, especially of our colonies. This, indeed, barring new discoveries, is certain. But the optimist will point out that new discoveries must not be barred; that 20 years ago the Rand had not been discovered; that 11 years ago there was no Cripple Creek or Kalgoorlie; that gold is one of the most widely distributed of metals; and that five years from now, taking note of the discoveries to be made in the meantime, it will be found that our fears for the future had been groundless. Of course, there is much in favor of the optimist's argument. Gold is a most widely distributed metal, and there must still remain hundreds—thousands—of undiscovered gold mines somewhere or other on the globe; but whether enough of these will be unearthed in the next few years to balance the approaching deficiency, I am not prepared to say. On known data there is going to be a falling off. To bear out this statement, let us make a survey of the world's gold mines, taking note of their present and of their future prospect.

The African Gold Fields.

We begin with the Rand basin. The immensity of this gold field becomes apparent when it is realized that, whereas most other fields are now producing at their maximum, this field can, during the next few years, granted only a sufficient supply of cheap labor, increase its output from £15,000,000, as at present, to double that amount. In course of time the Rand output may even exceed £30,000,000; some authorities have estimated it is likely to touch £50,000,000, but I cannot follow them in this assumption. The gold is known to exist, certainly; but reasons, financial and technical, prevent a simultaneous production from most of the newer mines for five or six years to come. By that time, just as all these newer mines are reaching the producing stage, a number of the present largest producers will be reaching their end, and every year after that several of these big mines will drop out.

Then there are all the outside fields in the Transvaal. These cover a great area; but their commercial possibilities are not important, and I cannot imagine a greatly increased output from these sources. Such mines as the Sheba, Transvaal Gold, Glynn's, Barretts', and Buffelsdoorn will not in the aggregate be producing more five years hence than they are now, and I do not take the mines of the Murchison Range, the Letaba and Klerksdorp, seriously.

Rhodesia will show an increasing output of gold for some years. This will be from its newer mines. The yield from the Wanderer (Selukwe), Globe and Phoenix, Surprise, Rezende, Morven, and the other mines now at work, will, in the aggregate, fall off; but against that the mines to be started—Ayrshire, Sabiwa, Jessie, Jumbo, Athens, Battlefields, and Penhalonga, and the leasing out

of a number of the smaller properties to tributaries—should show a considerable increase. I imagine that some time within the next five years the Rhodesian output should touch 40,000 ounces a month.

So much for South Africa. Turning to the West Coast, it is to be noted that a few small mines have survived out of the hundreds that were floated, and a few people to work them have survived from among those who braved the deadly climate. Neither are these mines so good, nor are their economic conditions so favorable, as has been represented; still, there will be an increase in the West African gold yield. For the last year or two a good deal of prospecting has been going on over the great area covered by Egypt, the Soudan, and parts of Abyssinia. I don't think the evidence up to date has gone to show that there are any permanent deposits of value yet discovered in this area.

Australasia.

All the evidence goes to show that from Africa, even leaving out the Rand as exceptional, there will be an increasing yield of gold. From Australasia, on the other hand, the evidence is that there will be a considerable falling off. Beginning with West Australia, I find it difficult to gauge whether the high-water mark of gold production has yet been reached. Personally, I should have said that it had not. But this opinion is not shared by some others, who point out that much of Westralia's yield has been from small rich mines, or "patches," which are now mostly worked out, and that in future these small mines will not contribute more than 10 per cent. of the total yield. The big mines of Westralia will have no difficulty, in my opinion, in keeping up their present production for years to come; but it would be an unsound state of things if the output had to depend for four-fifths of its total from a dozen big mines. I am certain that no country in the whole world would so well repay thorough prospecting—prospecting undertaken at government expense, if need be, and most systematically organized—as West Australia. Over its immense gold belt there are dozens of potential Fingalls and Gwalias and Lancefields; and for each such great mine discovered there will be a dozen or 20 satellites, rich little pockets of ore lasting for a year or two, which will make themselves felt in the gross output of the colony's gold. West Australia is, for me, the ideal gold field. I cannot believe its output is going to fall.

Victoria is now producing about £2,500,000 a year. This is a land of small mines, with the Bendigo gold field as a backbone. Victoria's gold yield is falling; but there is one eventuality which must be borne in mind—the Deep Leads. If these alluvial mines, the first of which should be drained some time next year, turn out successfully, and so far indications are favorable, the output of Victoria will go away up again, perhaps to a much higher figure than at present.

Queensland I look on as being in a serious position with regard to its gold mines. The Charters Towers and Gympie fields are being rapidly exhausted, and there are no mines of permanence in the smaller fields—Ravenswood, Etheridge, Croydon, Hodgkinson, or the Palmer. Mount Morgan, as an individual mine, is assured for many years; but the lack of any newer mines, or discoveries of new fields, is most disquieting. It seems to me that Queensland stands face to face with a big falling off at no distant date, and its government should take steps to have a systematic prospecting of the coastal gold belt undertaken.

New South Wales and the Northern Territories district of South Australia will not, so far as I know, show any increase in their small yield of gold.

Tasmania produces now about £250,000 a year from the Tasmania Golden Gate and Mount Lyell mines. If the first named turns out well in depth it could materially increase its yield, but the gold from Mount Lyell will decrease.

New Zealand will probably show a decreasing production of gold. The Waihi, producing £600,000 a year, has now reached its maximum, and the smaller mines—such as Crown, Talisman, and Progress—have not the elements of permanence. The dredging industry, I be-

lieve, has passed its high-water mark of production. The only possible increase—as against an otherwise falling output—is the Waihi Grand Junction; but it will be some years yet before the definite value of that mine is known.

Asia and Europe.

The next sphere we will consider is the East, embracing India, the Malay Peninsula, Sumatra, China, Japan, Korea, New Guinea, the Celebes, and Borneo.

As regards the Indian gold mines, it would appear as if the Mysore and Champion Reef were now producing at their maximum, and that the Nundydroog, Ooregum, Balaghat, Coromandel, and Tank Block had already passed that stage. In the Malay Peninsula the present output is quite insignificant. Sumatra, as a producer, I take to be on the up grade. There is the Redyang Lebong, a great mine, now passed under sound management; report speaks of the Lebong Soelit as also having a big future, and there are others. New Guinea, the Celebes, and Borneo, are all small producers of gold, but I have heard of no recent discoveries of value in any of them.

China produces astonishingly little gold, and, despite all the talk about gold in Manchuria, that country, too, contains nothing of ascertained value. In Japan the output is very small, but there are one or two properties there which are worth erecting small mills on.

Korea possesses permanent gold mines. Those that have been developed so far are big low grade deposits, and over 200 stamps, shortly to be further increased, are now at work. All of these are the property of the Oriental Company of New York, which is paying big dividends.

The gold output of the Russian Empire is confined almost entirely to the alluvial mines of Siberia, and from these there has been no increase for a long time. Quartz mining in Russia is an almost undeveloped industry, but it is hardly to be imagined that the immense area of that Empire does not contain within it many potential quartz mines of value. These, however, are for the future—many years hence. In the meantime, I anticipate rather a falling off in Russia's output of gold.

In Europe, outside of Hungary, there is no gold mining to speak of. The Hungarian mines are poor and patchy, and I hardly expect the present yield of 100,000 ounces a year to continue. There is one small mine in Bohemia.

America.

When we turn to the American continent, I foresee a big falling off in the gold yield of Canada and the States, and probably in South America, and an increase from Mexico. Central America is only a small factor.

Canada is a disappointment. The Klondike yield reached its highest figure of, I think, \$23,000,000, three seasons ago, and since then has declined seriously. The richer gravels must by now be exhausted, and the only thing that can revive the Klondike is the bringing in of water under hydraulic pressure. This is a work that may be recommended to the Ottawa Government. Elsewhere in Canada there has been no discovery of permanent value for years, while the older fields, Rossland, Nelson, Atlin, Lake of the Woods, and Ontario, have all fallen off seriously. Canada's gold output is declining.

The gold yield of the States is falling, and the outlook is not good. The main factor is the exhaustion of the richest Cripple Creek mines, but everywhere—on the Mother lode of California, in Montana, Idaho, Arizona, Nevada and Utah, the exhaustion of mines is not being accompanied by new discoveries of the same magnitude. Alaska, on the whole, gives the best promise for the future, but I expect the output of gold from the United States will be less in five years than it is to-day.

From Mexico I expect an increase. From the El Oro field alone, with the El Oro, Esperanza, Mexico, Dos Estrellas, and Victoria, all fully equipped, there will be quite a big yield, and there is promise of an increase from the less important districts.

South America some day ought to produce more gold than it does now. I have an idea that the Eastern slopes of the Andes—the Western slopes being notori-

ously rich in copper and silver—contain great gold deposits, but these areas are as yet mostly unprospected, and it may be many years before their riches are made known. In the meantime, the yields of such mines as the Inca, in Peru, and the St. John del Rey, in Brazil—the two biggest gold mines in South America—will fall off, and I know of no new discoveries to take their place. The alluvial deposits of the Guianas are becoming worked out. Patagonia gives promise of possessing good mines some day.

In the near future the aggregate yield from South America, as from so many other countries, is likely, pending fresh discoveries, to show a falling off.

The World's Gold Output in 1903

George E. Roberts, Director of the Mint, has completed his calculation of the production of gold and silver in the United States and in the world for the calendar year 1903. The production by countries is given as follows, the commercial value of the silver being computed at 54 cents per ounce:

<i>North America.</i>		
	Gold value.	Silver, commercial value.
United States.....	\$73,591,700	\$29,322,000
Mexico	10,677,500	38,070,000
Canada	18,834,500	1,700,800
Africa	67,998,100	185,300
Australasia	89,210,100	5,228,700
<i>Europe.</i>		
Russia	\$24,632,200	\$82,000
Austria-Hungary	2,245,100	877,000
Germany	70,600	3,144,100
Norway	2,700	106,900
Sweden	33,900	18,400
Italy	26,700	435,400
Spain	5,400	2,209,100
Portugal	1,300	.....
Greece .....	.....	573,600
Turkey	20,700	247,800
Finland	2,000	5,200
France .....	.....	403,600
Great Britain.....	77,300	79,000
<i>South America.</i>		
Argentina	\$30,000	\$50,000
Bolivia	1,000	4,843,600
Chile	666,900	1,402,600
Colombia	2,724,400	609,500
Ecuador	274,400	.....
Brazil	2,274,200	.....
Venezuela	84,500	.....
Guiana (British).....	1,611,300	.....
Guiana (Dutch).....	375,900	.....
Guiana (French).....	2,101,500	.....
Peru	592,600	943,200
Uruguay	51,500	.....
Central America.....	1,875,300	1,142,700
<i>Asia.</i>		
Japan	\$2,002,700	\$292,900
China	7,324,700	.....
Korea	3,000,000	.....
India (British).....	11,428,900	.....
East Indies (British).....	1,176,200	.....
East Indies (Dutch).....	501,500	66,200
Totals.....	\$325,527,200	\$92,039,600

The total number of ounces of gold produced is given as 170,443,670. These figures show a gain over the output of 1902 of \$29,637,600 in gold and 9,109,331 ounces in silver. The commercial value of the silver output is \$6,532,400 greater than in 1902, the value of the silver in that year being computed at 53 cents per ounce. The most important gains in gold were \$28,974,400 in Africa and \$7,631,300 in Australia, and the most serious loss was in the United States. The decline in the United States in 1903, as compared with 1902, was \$6,400,000 in gold and \$648,000 in silver, which is almost entirely due to labor troubles in Colorado.

The Electric Controller & Supply Company, Cleveland, Ohio, announces the opening of a Southern branch office at 509-510 Woodward Building, Birmingham, Ala. This company is now represented in the following cities: New York, Philadelphia, Pa., Pittsburgh, Pa., Cleveland, Ohio, Birmingham, Ala., Denver, Col., San Francisco, Cal., and London, England.

Mexican Railway and Industrial Notes.

DURANGO, September 28, 1904.—The fact that this is a Presidential election year in the United States has had a visible effect upon business in Mexico. There has been a marked falling off in the influx of capital for investment in new enterprises, which may reasonably be traced to this cause. No recent sales of large mining properties are reported. While crops are good, and the outlook from an agricultural standpoint is most promising, there seems to be a temporary check to the fever which existed a short time since for reckless investment in tropical lands. General business in merchandising continues upon an even tenor, with signs of increasing activity. A new governor has been elected in this State. The hope is entertained that the change of administration will prove beneficial, and that the new executive will inaugurate an active policy for the development of the State's mining, agricultural and manufacturing industries.

The President's Address to Congress.

According to custom, Congress opened upon the evening of September 16, the anniversary of Mexican independence. The address of President Diaz, as usual, was an exhaustive one. He reviewed at length the country's progress in material development, legislative efficiency and other lines of activity. "The metallic output," he remarked, "continues to increase, but the increase has been particularly marked in regard to copper, placing Mexico second in the list of producing countries." He informed the chamber that the railway system had been increased by 273 km., "contributed chiefly by the National of Mexico, the united roads of Yucatan, the Nacozari, the Pan-American, the Oaxaca to Ejutla, and the Hidalgo." The mileage now aggregates 16,495 km. He concluded his address by congratulating the deputies upon the existing conditions in the Republic, which afford evidence of the fact "that the country has entered resolutely upon the ways of unquestioned progress."

Railway Concessions and Construction.

A concession has been obtained by Benjamin Barrios of the City of Mexico covering an ambitious project in railway construction. This is the building of an electric line from the capital to the city of Puebla, the capital of the State of that name, 102 km. distant. It is said that the work of construction will be in German hands and that the equipment will come from Germany. According to the terms of the concession, at least 10 km. of the line must be constructed next year.

The concession granted to the Guaymas & San Marcial Railway Company for the construction of a line from Guaymas, Sonora, to San Marcial has been modified, an additional year's time from August 24 being allowed for the completion of 33 km. of the road.

Industrial Notes.

Large orders for material and supplies, including steel rails, boilers and oil drilling engines, have been placed in the United States by the Oil Fields of Mexico Company, which is developing oil lands in the State of Vera Cruz. The company gives out the information that its first well sunk has proved successful, petroleum of good quality having been struck.

An agency has been opened in the city of Monterey, of which E. Rochette is general manager, by the Power & Mining Engineering Company of New York.

The construction of another large power plant for the transmission of electrical energy is projected. The enterprise is being promoted by the holders of a concession to utilize the waters of the Santiago River, in the State of Jalisco, to supply electrical power to the city of Aguas Calientes, more than 100 miles distant. New York and Guadalajara people are interested in the project.

Bernard J. Mahony, representing R. M. Burke, former United States Consul in Chihuahua, has obtained a concession to construct a power plant on the Conchos River, to supply light and power to Parral and Chihuahua. A company, of which John H. Kelly of New York is president, has been formed to carry out the undertaking. It is said that \$1,000,000 will be expended in the work.

A concession has also been obtained by Guillermo Vega

for the construction of hydraulic works necessary to utilize for motive power or industrial purposes 10,000 liters of water per second from the Baluarte River, in the State of Sinaloa. Seven years are allowed for the construction of the plant.

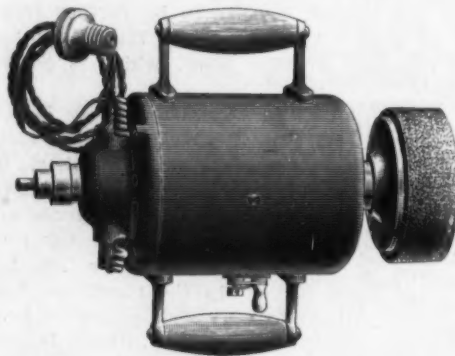
Representatives of United States steel manufacturers in the capital report a good local demand for steel products.

In 11 months of the fiscal year 1903-1904 the imports amounted to \$71,297,901.22, gold value, against \$68,966,200.68 in the corresponding months of the fiscal year 1902-1903. Machinery and apparatus valued at \$9,333,854.51 are included in the total first given.

J. J. D.

The Hisey Portable Motor Driven Hand Buffer or Grinder.

The Hisey-Wolf Machine Company, Cincinnati, Ohio, is offering something entirely new in the way of a portable electrically driven hand buffer or grinder, which is illustrated herewith. This machine is adapted for polishing, grinding, buffing, sanding, or any other work of similar nature. It is light, weighing but 14 pounds, and the driving power is obtained from an ordinary incandescent lamp socket by using any length of cord necessary to reach the work. The motor is inclosed and as nearly dust proof as possible, and the bearings are



The Hisey Portable Motor Driven Hand Buffer or Grinder.

adjustable for wear. The two handles are diametrically opposite, enabling the operator to hold the motor firmly, and to manipulate it to advantage. The machine is under the immediate control of the operator at all times by means of a switch located near one of the handles. Any kind of wheel can be attached, making the machine adaptable to almost any class of work. The handling of heavy castings, requiring grinding, involves a considerable loss of time and money. This motor obviates most of this handling, as it can be taken to the work.

The Fort Worth Steel & Mfg. Company has been organized with a capital stock of \$200,000 to conduct a rolling mill at Fort Worth, Texas. The incorporators and officers of the company are: President, W. K. Frogg, Alliance, Ohio; vice-president, F. G. McPeak; secretary, Jack T. Anderson; treasurer, W. H. Eddleman. The company has acquired 75 acres of ground, and within a very short time will begin the erection of buildings. Of the two buildings now planned, one will be 160 x 200 feet and the other 100 x 160 feet in size. Machinery for the plant will be moved from a plant at Alliance, Ohio. Employment will be given at the start to about 350 operatives.

German builders of machinery complain bitterly of a growing abuse. Manufacturers of iron and steel, when ordering machinery, demand more and more that a part of the price be taken out in trade. Some of the iron makers have insisted recently that machinery builders contract for iron and steel to the extent of 40 and even 50 per cent. of the selling price of the machinery purchased.

Archer Brown.

Few men have enjoyed a wider acquaintance in the iron trade than Archer Brown of the firm of Rogers, Brown & Co., whose death occurred at East Orange, N. J., on September 23. Mr. Brown presents one of those rare examples in which a man achieves almost instant success in a branch of business in which he had not been specially trained. It is most unusual for one to attain prominence in a calling to which he had devoted his youthful energies and then turn his attention in a totally different direction and almost from the very beginning take a leading position in his new field. The accomplishment of this achievement marked Archer Brown as a man of far more than average business ability. His career is exceptionally interesting.

Mr. Brown was born in Otsego County, N. Y., March 7, 1851. The family removed to Flint, Mich., while he was a boy, and he attended school there, subsequently entering the University of Michigan at Ann Arbor, from which he was graduated in 1872. Having a taste for journalistic work, he went to Cincinnati immediately after graduating and for nine years was connected in various capacities with the newspapers in Cincinnati, becoming managing editor of the *Cincinnati Gazette*. Although he had little or no knowledge of the iron trade, he became convinced that greater opportunities for business success could be found in that direction, and on January 2, 1881, he formed a partnership with William A. Rogers and others under the name of Rogers, Brown & Co. Mr. Rogers had for some time conducted a pig iron business in that city, and the firm started with a number of furnace agencies. The business prospered and branches were rapidly established in a number of cities as opportunities for increasing the trade of the firm were observed. In September, 1895, Mr. Brown removed to New York upon the opening of the branch house here.

The firm did not confine its business exclusively to the sale of pig iron, but from time to time became interested in its manufacture. At the time of his death Mr. Brown was vice-president of the Tonawanda Iron & Steel Company, chairman of the executive committees of the Empire Steel & Iron Company and the Alleghany Ore & Iron Company, and a director of the Cleveland Furnace Company, Iroquois Iron Company and Alabama & Georgia Iron Company. He was also a director of the Empire Trust Company, the Phoenix National Bank and Plano Mfg. Company.

His journalistic training gave Mr. Brown the faculty of keen observation, critical analysis and facility of expression which caused his views to be sought, and he was not only a frequent contributor to the trade press, but was a favorite recourse for the interviewers of the daily journals. Judicial in temperament, he could see both sides. He also wrote several books, one of which, ad-

ressed to young men, published two years ago, has reached a sale of 210,000 copies, having been translated into several languages, including Japanese and Chinese.

Mr. Brown was active in church and Sunday school work, besides taking a deep interest in matters affecting the general public welfare. He was a trustee of Calvary Methodist Episcopal Church and superintendent of its Sunday school at East Orange, N. J.; vice-president of the Orange Young Men's Christian Association, a member of the International Committee of the same organization and president of the Citizens' Union, East Orange. He was married in 1880, and leaves a widow and four children.

Allis-Chalmers Personnel.

The following items concerning the *personnel* of the Allis-Chalmers Company indicate the energy with which the new administration of this company is effecting its organization.

Chas. S. Buell, mechanical engineer, who until recently represented the Westinghouse Machine Company in Chicago, has taken a position as salesman and engineer in the power department.

John F. Burke, for a number of years with the Westinghouse Electric & Mfg. Company in Omaha, Neb., has joined the selling force, with headquarters in that city, and will engage in the sale of Corliss engines, electrical apparatus, and crushing and cement machinery.

Wilbur M. Ruth, until recently assistant to the president of the Mesta Machine Company, Pittsburgh, Pa., and previously employed on the engineering staff of the E. P. Allis Company, has accepted a position as salesman and engineer at the company's Pittsburgh office.

M. C. Miller, one of the leading men in the alternating current department of the Westinghouse Electric & Mfg. Company, Pittsburgh,

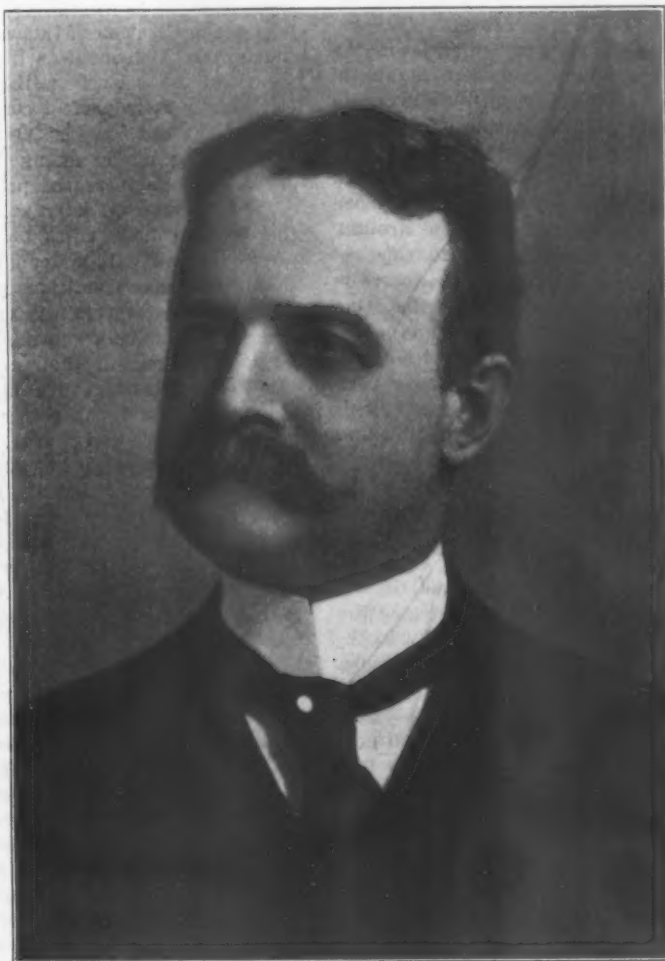
has accepted a similar position with the Allis-Chalmers Company.

Chas. F. Adae, for several years in the employ of the Westinghouse Electric & Mfg. Company, Pittsburgh, and lately manager of the Pittsburgh office of the C. Lee Cook Company, has been appointed to the selling force at the New York office.

S. H. Sharpsteen, for a number of years with the General Electric Company as salesman, has accepted a similar position in the New York office.

G. Fred Collins, who has a very extensive acquaintance throughout the East among officials and engineers of large railroad and steel companies, has recently entered the company's employ as special representative at the New York office.

W. M. S. Miller, who was in the employ of the Westinghouse Electric & Mfg. Company in the manufacturing, production and detail correspondence departments, and until lately in the detail and supply department, covering a period of 14 years, has joined the company's staff, with headquarters in Chicago.



ARCHER BROWN.

John V. Redfield, after some years in the works and in the Chicago sales office of the Westinghouse Electric & Mfg. Company, has been appointed to the sales staff at the Chicago office.

James Ashworth, until recently engineer of the city of Chicago, in the department of Water Supply, has entered the company's employ as salesman in the pumping engine department.

Otto Clyde Ross, for several years employed with the Westinghouse Machine Company as engineer and salesman, and lately in the employ of the Hartford Lead, Zinc, Mining & Smelting Company as engineer, has accepted an appointment as engineer and salesman.

The Bituminous Coal Trade.

BY FREDERICK E. SAWARD.

A feature which interests manufacturers is the probable increase in the price of bituminous coal. Consumers have been having things pretty much their own way during the past few months, but now there is an inclination and disposition on the part of producers to mark up values, and the New River people are the latest in taking the initiative. The Pennsylvania districts have felt the competition of those shipping at Hampton Roads ports, but these latter are going to have more money for their coal before another season turns around. Improved industrial conditions would help to this result, but unanimity of action on the part of producers is also needed to give an improvement along this line. One district and another is increasing its tonnage, and when there is competition at certain markets the price is reduced to figures much below what was the case a year ago, yet in other markets they compare favorably with what prevailed a few years back, before the demand took up the increasing output; there is again an example of this in the competition that has taken place for the seaboard trade. Here the prices come to less than cost, in some instances, and now one hears of an effort to pull up values; not to the extent of an advance of \$1 a ton, but there will be an increase. Bituminous coal is not yet on so firm a foundation in the matter of price as the producer would like to see, but what can one say in regard to unsatisfactory tonnage in this trade as a whole, when the output is 1,000,000 tons a day? With all this coal being used up every day, is there not something at fault in regard to the merchandising methods which permit prices to be cut to cost? Never in the world's history was the fuel industry of so great importance as it is at present, and the future promises even better things. It is a pretty sure indication that the industries of the country are doing some business at least when we are using up coal at the rate named, for stocks of soft coal are never large.

There is an increasing use of soft coal in all parts of the country for steam heating, and the quickness with which the market responded to the change in the temperature is noteworthy, which seems to prove that consumers have very little coal in their bins, and that the winter's demands will be more than customary with the same temperatures. The flat state of the coal trade during the past summer and the quadrennial disinclination of consumers to load up are ample reasons for the present dearth of tonnage in the bins. It is really surprising, with the general impression that the railroad tracks are burdened with coal in certain interior parts of the country, how little it takes to give a spurt to the trade. A few days ago a jobber received an order for 100 cars of lump. It was a large order, as it looked to the acceptor, and when in his exultation he went forth to gather in enough cars to fill it, the news seemed to travel before him, and it was only with difficulty that he procured the desired quantity. It was not until the price had advanced 10 or 15 cents per ton that the last car was bought. Inquiries have begun to come thick and fast, and shippers are kept busy answering them. The one favorable feature of the market is that consumers are not trying to beat down the prices as much as they did some time back. With a good demand the price question must be left to work itself out, which it will doubtless do.

While there is a little more contracting done than usual, it is not what it ought to be at this time of the year. There is a general opinion among the producers that steam users have made a mistake in not placing orders some time ago, when they could have tied up a year's supply at almost anything from the actual cost of the coal at destination. The bottom was reached and the producers could go no further. Now they are not so anxious, as they have begun to feel that if they do not make a little profit the coal is better off in the ground. With that condition confronting them, buyers are not going to find so many soft snaps.

Tidewater business is especially looking up. The trade is feeling the effects of growing industrial activity, and inquiries are more numerous and the general tone of the market is stronger. With the Carriers' Association still obdurate, it is needless to say that tidewater business remains dormant, the few sailings being only exceptions to prove the rule. The result will probably be a demoralization of tidewater shipment which will last indefinitely, inasmuch as the feasibility of all rail shipments to the East is well past the experimental stage. Car supply is in perfect condition, as has been the case throughout the summer. Great interest is taken in the effort being made among West Virginia operators to agree upon an increased price. Pennsylvania producers of bituminous coal have suffered heavily as a result of the bargain f.o.b. rates on coal from this competitive territory, and will, of course, suffer still more heavily should the same conditions prevail through another winter. The West Virginia interests have only taken advantage of a business opportunity presented through the wage conditions in their territory, and have undoubtedly secured lasting advantages through exploiting their coals, particularly at points reached by seaboard shipments. The trade at large believes that the West Virginia trade campaign has unnecessarily reduced its own earnings and unnecessarily punished competitors in the amazingly low prices asked for its products, prices which practically wiped out competition so far as Pennsylvania producers were concerned. An increase in prices at Norfolk and Newport News to \$2.50, f.o.b., gives Pennsylvania a competitive chance, and would be followed by a restoration of the tidewater business at Northern ports.

In fact, in all directions the bituminous coal trade shows indications of emerging from the depths of depression in which it has been for several months. The next few weeks may bring some interesting developments. There have in the recent past been a number of meetings of representatives of mining interests in the Pocahontas and New River fields in an endeavor to reach a more satisfactory basis as to operations and prices. The coal from these fields is a superior article, commanding a higher price than the Pennsylvania or Western product, and recently, because of the near approach of the two kinds in prices, there has been a notable increase in the Pocahontas and New River varieties. This has resulted in quite an increased tonnage for Norfolk & Western and Chesapeake & Ohio. The Pocahontas region has an advantage over New River, the miners in the former field being independent, while in the latter the men are dominated by the union. This means that in the New River region some operators who opened up mines in the abnormally prosperous period of two years ago have been obliged to shut down or curtail output. These are now, naturally, anxious for any arrangement which may tend to raise prices to a level where mining can be profitably carried on.

The contract for a sheet bar and tin plate bar mill placed by the Republic Iron & Steel Company with the United Engineering & Foundry Company, Pittsburgh, covers a 28-inch mill, tables, saws, hot beds and shears. The mill will be hooked to the present billet mill at the company's plant at Youngstown, Ohio, and will be interchangeable, so that either bars or rails can be rolled. It will take about six months to build the mill, which will have a daily capacity of about 600 tons. The United Engineering & Foundry Company has ready for shipment a 16-inch bar mill to Portland, Ore.

Business and Politics in Canada.

The General Elections.

TORONTO, October 1, 1904.—The Dominion general elections are to be held on Thursday, November 3. Evidently the Government desires a short campaign, or it would not have waited until five weeks before the date of voting to make the announcement. No one, and business men least of any, will be disposed to find fault with the shortening of the period of high political excitement. For educational purposes a long campaign is unnecessary. With the leading questions to be discussed the public are familiar. In fact, for the last two years they have had an excess of political discussion. The Parliamentary sessions of 1903 and 1904 were extraordinarily long, and the debates were reported with great fullness in the newspapers, whose editorial columns teemed with comment on every feature of Ministerial and Opposition policy.

Of the issues which divide the parties two stand out conspicuously. These are the fiscal question and the transcontinental railway question. On the latter question the Government is committed to a definite scheme which is embodied in the National Transcontinental Railway legislation of 1903 and 1904, wherein it is provided that about 1900 miles of the new road shall be built by the Government, that the remaining 1600 shall be built by the Grand Trunk Pacific Railway Company, and that the whole road shall be operated by the latter, the Government receiving a rental after seven years of 3 per cent. on the capital cost of the 1900 miles. Further, the Government guarantees 75 per cent. of the bond issue required to pay for the construction of the 1600 miles owned by the company. According to the computation of R. L. Barden, the leader of the Opposition, this arrangement means the commitment of the country to a total liability of \$150,000,000 to \$170,000,000. Seeing that the public credit is to be so heavily involved in the enterprise, he declares for out and out public ownership of the road. He is opposed, not to the road, but to the public paying for it and the company owning it.

The Government and the Tariff.

In regard to the tariff the Government has been getting more and more comprehensive. In none of their recent utterances have Ministers taken a stand for or against any tariff principle. Up almost to the time they came into office in 1896 they were professing free-traders. For several years after that they were satisfied to advocate "free trade," continuing to denounce protection. Of late they abstain nearly as much from condemning protection as from advocating free-trade. A phrase they frequently make use of is "a tariff for the interests of Canada." They insist that trade being a moving equilibrium, no tariff can be a finality. The revision of 1897, they hold, suited the conditions of that year, and the several changes since made in it were necessary adjustments to a varying environment. They will not say that the tariff as amended in June is nicely gauged to present needs. There is to be a reference of the matter to a tariff commission which the Government promises to appoint after the general elections should these be favorable. In his budget speech nearly four months ago Finance Minister Fielding said it was not pretended that the changes in duty then introduced would perfect the tariff. The commission referred to would, he said, find out exactly what was required and effect would be given to the commission's recommendations. His remarks, covering this point, were, in part, as follows:

The tariff is a delicate and complicated piece of machinery, which requires careful handling. It would be very easy by rash and ill-considered changes to create a serious disturbance in the business affairs of the country. We believe that in the changes we have made we have dealt with the matters of greatest urgency. We believe that we have gone far to meet the legitimate demands which have been presented to us for revision of the tariff. As respects the other articles in the tariff with which we have not dealt, and of course there are a great many, all I can say is that we do not claim for a moment that the tariff is perfect, but we do say that before we should enter upon a policy of numerous changes there should be a careful inquiry, and that inquiry we are prepared to make, so that if there are inequalities or other defects in the tariff we shall be able to remedy them in due course.

To this purpose of a thorough revision after investigation Sir Wilfrid Laurier adverted in the speech at Sorel on Wednesday. He assured the large audience he addressed there that a searching inquiry by commission would be followed by the necessary changes. In which direction those changes will lean, or which way the Government thinks they should lean, he did not say, though, like Mr. Fielding in Parliament, he declared that the high or "adequate" protection called for by the Opposition would be had for the country. Mr. Fielding had hinted that the structure of the tariff would probably be changed. There would in all likelihood, he said, be three grades of duty on at least some of the articles taxed—namely, maximum, minimum and preferential. The first of these duties would apply to goods coming from countries discriminating against Canada, as Germany does, and to goods coming from ultra-protectionist countries generally. The second would apply to goods coming from countries in reciprocity with Canada. The preferential duties would relate to imports from British sources, and possibly be confined to specified articles, instead of applying to the whole dutiable list, as they do to-day.

In his Sorel speech Sir Wilfrid Laurier declared his readiness to negotiate a treaty of reciprocity with the United Kingdom. He had nothing to say about reciprocity with the United States. That once leading plank of the Government's platform is now little heard of.

Adequate Protection

R. L. Barden, the leader of the Opposition, makes "adequate protection" the main feature of his trade policy. With that he associates the principle of mutual preference. He holds that the manufacturing industries of the country are too much exposed to foreign competition. He would invite this competition by higher duties, but would be willing that some of the trade thus cut off from the United States should be transferred to Great Britain under a preferential arrangement, which should secure Canadian foodstuffs better terms in the British market than those open to foodstuffs produced outside the empire.

Manufacturers' Demands.

The Canadian Manufacturers' Association has quite recently made representations to the Government as to the inadequacy of the protection now afforded by the tariff. In his address at the annual meeting of the association in Montreal on September 20 to 23 the retiring president, George E. Drummond, made a strong plea for a radical change in the tariff.

The Effect of the Elections.

Undoubtedly if the Conservatives are elected the tariff will be revised upward. If the Liberals are retained in office it may be revised downward. They would take their re-election as an expression of public confidence in the course they have followed, and it is extremely improbable that they would make any marked departure from that course. As to the chances of the two parties, they seem in favor of the one that is now in power, though a triumph for the Conservatives would surprise no one. There are two or three advantages on the Government's side. One is the redistribution of constituencies which took place two years ago. The party in power, especially when it has so large a majority as the Liberals have, is likely to "gerrymander" the ridings to the disadvantage of opponents. In the second place, the Grand Trunk Pacific bargain is expected to be productive of campaign funds. In the third place, Canada has still good times.

C. A. C. J.

The use of lampblack as a fuel under steam boilers was described in a paper recently read before the Pacific Coast Gas Association by C. H. Pennoyer. This has been successfully tried at the works of the United Gas & Electric Company of San José, Cal. The lampblack is burned on grates made up in three sections, 8 inches long each, with spaces $\frac{5}{8}$ inch wide between, and $\frac{1}{2}$ inch slots in the bars. It is mixed with heavy tar and the partially consumed and coked lampblack from the ash pit, and when ready for firing contains about 30 per cent. moisture. Thoroughly dry lampblack is stated to have a heating value of about 14,200 British thermal units per pound.

Iron and Steel Exports and Imports in August.

According to the report for August, just issued by the Bureau of Statistics of the Department of Commerce and Labor, the exports of iron and steel for that month, including machinery and all other iron and steel manufactures, but excluding ore, reached a total value of \$10,430,331, against \$8,237,519 in August of last year. The figures for the eight months ending August were, respectively, \$81,415,122 and \$65,345,010. Taking the commodities for which quantities are given, the exports for August fell below those of each of the three preceding months, the figures being as follows: May, 107,646 gross tons; June, 119,179 tons; July, 108,039 tons; August, 101,124 tons. As compared with August of last year, however, a very great increase was made, as the figures in that month were only 20,471 tons. The detailed figures for the month and eight months are given in the following table:

Commodities.	Exports of Iron and Steel.		Exports of Iron and Steel.	
	August.		Eight months.	
	1904.	1903.	1904.	1903.
Pig iron.....	1,315	1,668	27,639	10,864
Scrap.....	2,772	349	17,024	2,928
Bar iron.....	3,427	1,565	20,842	13,979
Wire rods.....	5,810	2,122	18,755	18,360
Steel bars.....	2,435	649	16,498	13,252
Billets, ingots, blooms.....	28,379	214	236,451	1,019
Hoop, band, scroll....	290	115	2,112	1,302
Iron rails.....	5	4	1,614	143
Steel rails.....	35,631	371	210,178	5,124
Iron sheets and plates	442	279	3,106	2,665
Steel sheets and plates	6,942	882	23,648	8,564
Tin plates and terne plates.....	916	3	4,662	167
Structural iron and steel.....	5,035	1,525	31,192	20,670
Wire.....	5,796	7,573	72,697	70,124
Cut nails.....	532	844	6,609	5,730
Wire nails.....	1,768	2,135	18,611	20,403
All other, including tacks.....	219	173	1,867	1,469
Totals.....	101,124	20,471	708,505	196,768

Examining the detailed figures for August, it will be observed that the largest items are steel rails and steel billets, the latter including sheet and tin plate bars. The export figures for steel sheets and plates and structural iron and steel are now showing a considerable advance on the preceding months of this year. Our exports of tin plates and terne plates are also steadily increasing, the exports for August having been 916 tons and for the eight months ending with August 4662 tons.

The imports of iron and steel show a slight falling off as compared with July and a marked decline as compared with August of last year. The figures for August are 20,878 gross tons; for July, 21,891 tons, and for August of last year, 89,601 tons. The total value of the imports of iron and steel, including manufactures thereof, but not including iron ore, amounted to only \$1,751,822 in August, as compared with \$3,440,100 in August of last year. For the eight months ending with August the total value of such imports was \$14,749,825, against \$32,289,525 in the corresponding period of last year. Taking the commodities for which quantities are given, the following table shows the imports for the month and eight months:

Commodities.	Imports of Iron and Steel.		Imports of Iron and Steel.	
	August.		Eight months.	
	1904.	1903.	1904.	1903.
Pig iron.....	3,841	40,475	51,943	530,972
Scrap.....	5,042	5,664	13,936	72,139
Bar iron.....	1,546	3,501	14,675	29,606
Rails.....	201	9,347	34,230	85,077
Hoop, band and scroll.	11	500	1,244	1,391
Billets, slabs, bars, &c., steel in forms n.e.s.	705	20,380	8,167	229,681
Sheets and plates....	175	1,200	3,422	6,838
Tin plates and terne plates.....	7,127	3,115	48,795	33,772
Wire rods.....	1,217	1,888	10,732	13,919
Wire and articles made from.....	277	384	2,837	3,279
Structural iron and steel.....	708	3,111	5,504	3,930
Chains.....	28	17	270	295
Anvils.....	...	19	91	150
Totals.....	20,878	89,601	195,846	1,011,049

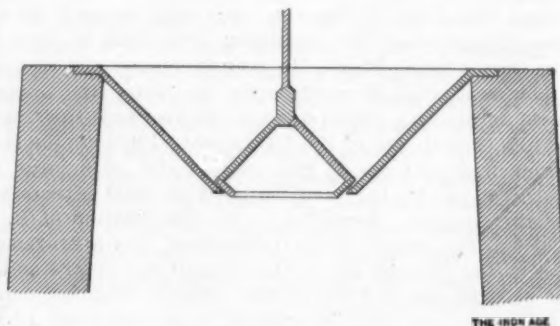
* Included in "All other" prior to July 1, 1903.

The imports of iron ore in August were 39,708 gross tons, against 153,430 tons in August of last year, and for the eight months ending with August, 238,576 tons, against 723,325 tons in the corresponding period of last year.

A New Arrangement for a Furnace Bell and Hopper.

BY S. B. PATTERSON, ALLENTOWN, PA.

Reading the article in *The Iron Age* of September 22. "Blast Wandering in Furnaces," a method occurs to me of accomplishing Mr. Witherbee's suggestion that "better results in running might be had by charging nearer the center." Instead of placing the bell under the hopper, why not put it above, somewhat as represented by the drawing herewith given? This arrangement would leave the fine stock in the center and put the coarse to the furnace walls. Other advantages besides that stated by Mr. Witherbee would be, first, that the stock could be kept at a higher level in the furnace, practically making the furnace that much higher, and, second, the wear of the lining at the stock line would be less, as the stock



A New Arrangement for a Furnace Bell and Hopper.

would roll down against it instead of being shot against it, as by the present system.

Perhaps it would be well to attach the bell to a rigid upright rod working in guides, so that it would seat itself squarely in the hopper. It would be immaterial whether the bell was raised by the rod or by an auxiliary chain. It would not require much mechanical ingenuity to make the bell stationary, and to arrange the hopper to slide up and down. This latter plan, however, would decrease the maximum height at which the stock in the furnace could be kept.

Machine Tools in Germany.—Consular advices from Frankfort, Germany, to the Department of Commerce and Labor state that the association of German manufacturers of machine tools, in a report on the condition of the machine tool industry, complains that sharp competition in foreign markets makes it difficult to obtain orders or remunerative prices. The importation of American and English machine tools into Germany is notably increasing. During the first half of this year 1100 metric tons of foreign machine tools entered Germany, against 450 tons in the same period of the preceding year. The association therefore demands higher tariff rates on imported machine tools, in order to check their importation and thus protect the interests of German manufacturers.

The Buffalo & Susquehanna Plant Started.—The first cast of pig iron at the new plant of the Buffalo & Susquehanna Iron Company, Buffalo, N. Y., was made last week, and the two furnaces of the company, each of 400 tons daily capacity, are now in full operation. This plant is believed to represent the most advanced step in modern construction of blast furnaces, and all that remains to make it one of the best equipped in the country is the completion of the ship canal, 23 feet deep and 200 feet wide, now in course of construction for the unloading of ore.

Proposals for New War Ships to Be Asked.

WASHINGTON, D. C., October 3, 1904.—The Navy Department will shortly issue circulars defining the chief characteristics of the 16,000-ton battle ship and two 14,000-ton armored cruisers authorized by the last naval appropriation act. Plans and specifications for the three ships will be ready for the inspection of builders on October 15, and bids for construction will be opened on December 15. The department hopes to award the contracts before the end of the current calendar year, and will give full weight to proposals involving any reduction in the period of construction.

The plans for the battle ship, while following the general outlines of the "Connecticut" and "Louisiana," will involve a number of changes of more or less military significance, but are also of special importance to sub-contractors. The general dimensions and features of the vessel are as follows:

Length on load water line.....	450 feet.
Breadth, extreme, at load water line.....	76 feet 10 inches.
Displacement on trial, not more than.....	16,000 tons.
Mean draft to bottom of keel at trial displacement, not to exceed	24 feet 6 inches.
Total coal bunker capacity, about.....	2,350 tons.
Coal carried on trial.....	900 tons.
Feed water carried on trial.....	66 tons.

The main battery will be the same as that of the "Connecticut" and class, except that the new vessel will carry four submerged torpedo tubes, and will include four 12-inch, eight 8-inch and twelve 7-inch breech loading rifles; the secondary battery will differ materially from that of the "Connecticut" and class and will embrace twenty 3-inch 15-pounder rapid-fire guns, twelve 3-pounder and four 1-pounder semiautomatic guns, two 3-inch field pieces, two machine guns, caliber 0.30, and two automatic guns, caliber 0.30. The arrangement of the batteries does not differ materially from that of the "Connecticut" and class.

Armor Protection and Motive Power.

The hull is protected at the water line by a complete belt of armor 9 feet 3 inches wide, having a uniform thickness of 9 inches for about 285 feet amidships, gradually decreased to 4 inches at the stem and stern. The engines will be of the vertical twin-screw four-cylinder triple expansion type, of a combined indicated horsepower of 16,500, and arranged for outboard turning propellers when going ahead. The steam pressure will be 250 pounds. The stroke will be 4 feet. The cylinder diameters will be sufficient for the required indicated horsepower at about 120 revolutions per minute. Each engine will be located in a separate water-tight compartment. While the Babcock & Wilcox water tube boiler was specified by the department in the case of the "Connecticut" and class, the circular for the new boiler provides simply for "12 water tube boilers placed in six water tight compartments, the type of boiler to be as approved by the Bureau of Steam Engineering." Further provisions regarding the boilers are as follows:

There will be not less than 1100 square feet of grate and not less than 46,750 square feet of water heating surface. The working pressure will be 265 pounds. The length of grates will be about 6 feet 9 inches. The steaming capacity will be such that all steam machinery on board can be run at full power with an average air pressure in the fire rooms of not more than 2 inches of water. All parts of the boilers subject to pressure will be of wrought steel. There will be no screw joints in contact with the fire. No malleable or cast iron or cast steel will be used under pressure. Generating tubes will be straight and not less than 2 inches in diameter. The provision for removing and renewing tubes, the method of baffling to provide for the proper circulation of the gases, and the facilities for cleaning soot off tubes and baffles will be fully shown on plans submitted by the bidders.

It will be noted that the Field tube is not excluded by these specifications, which is taken to mean that the Niclausse boiler has been restored to favor in the Bureau of Steam Engineering since the department's attention has been called to numerous improvements therein.

A Well Equipped Machine Shop to Be Furnished.

A feature of the new battle ship will be a specially equipped machine shop with a schedule of tools differing

materially from any heretofore installed. These tools, which are to be run by electric motors, are as follows:

One screw cutting back geared extension gap lathe, to swing 28 inches over the upper ways and 48 inches over the lower ways, and to take between centers 10 feet when extended.

One 14-inch screw cutting back geared lathe, to take not less than 4 feet between centers.

One column shaping machine of about 15 inches stroke and not less than 15 inches traverse.

One upright drill press, to drill up to 1½ inches in steel, 14 inches from edge of work, with at least 14 inches traverse of spindle.

One 16-inch sensitive drill.

One universal milling machine, with at least 18-inch table feed, 4½-inch traverse, and 13-inch vertical feed.

One combined hand punch and shears, with 6-inch shear blades, to cut ¾-inch round iron, shear ¾-inch steel plate, and punch ¾-inch holes in ¾-inch mild steel plates 4 inches from edge.

One emery grinder on column, with two carborundum wheels 12 inches in diameter and 2-inch face.

One 4 x 30 inch grindstone, with iron trough, on legs.

Six bench vises.

One blacksmith forge.

All necessary and usual spare parts, tools, &c., will be furnished for the above machine tools.

The Armored Cruisers.

The two armored cruisers will follow the general outlines of the "Tennessee" and class, but, while the Board on Construction has adhered to the external dimensions and general arrangement of battery and armor of this class, it has made certain important changes in water tight subdivisions, interior arrangement and arrangement of armor protection in the vicinity of magazines and barbettes. The main transverse bulkheads below the protective deck are not fitted with doors, thus limiting access to each pair of engine and fire rooms from above the berth deck only. This is regarded as of very great importance in maintaining the buoyancy of the vessel under collision or in the case of under-water damage by torpedoes. The wisdom of this plan is believed to have been fully demonstrated by observations made during the Russo-Japanese war.

The vertical armor and nickel steel deck protection has been rearranged fore and aft and the barrette armor increased 1 inch on exposed surfaces. The side armor has been slightly reduced in length on the athwartships armored bulkheads located abreast of the barbettes, and the nickel steel plating of the protective deck over the magazines has been increased from 40 to 60 pounds. Another new feature is the abandonment of cellulose packing for the cofferdams behind the armor, this substance having proved of doubtful utility after being packed for several years. In this departure the department is following the latest foreign practice. Reserve space will be supplied for 20 per cent. additional 10 and 6 inch ammunition in time or war, and the efficiency of the vessels thereby materially increased. To provide for these increased weights the board has omitted all fittings which do not add to the military efficiency of the ship. This is a decided innovation, as such additions have been made in the past to an extent which is not regarded as compatible with the increasing demands of the strictly military element.

W. L. C.

T. H. Speddy & Co., whose main office is in Wells, Fargo & Co.'s Building, San Francisco, Cal., have taken additional agencies for American manufacturers, among whom are James McKay & Co., chain manufacturers, Pittsburgh, Pa., and the Riverside Boiler Works, range boiler manufacturers, Boston, Mass. The firm recently opened a branch office in Los Angeles, Cal., and another in Portland, Ore., both of which will be under competent management. The agencies of this firm comprise manufacturers of hardware, metals, rolling mill products and carriage and wagon materials.

The Buffalo & Susquehanna Steamship Company, an auxiliary of the Buffalo & Susquehanna Iron Company, has placed an order with the American Shipbuilding Company for the construction of a steel steamer 500 feet long over all, 480 feet keel, 52 feet beam and 30 feet in depth, the cost of which will be \$330,000.

The Blaisdell Special High Speed Lathe.

The features of special note in the engine lathe shown in the accompanying illustrations are a quick change feed mechanism, a reversing mechanism and a new friction device in the apron. This lathe is built by P. Blaisdell & Co. of Worcester, Mass., and is specially designed for the use of high speed steel tools to do the heaviest work that the lathe will swing. The actual swing is 22 inches, but the lathe is rated as a 20-inch lathe. The quick change feed device consists of a nest of gears, the changes of which are made by manipulating the vertical lever shown just below the head in Fig. 1. Fig. 2, a detail drawing of the change feed gearing, indicates the principle of its operation and is almost self explanatory. There are five positions of the lever, in each of which it may be locked by means of a stop pin engaging in holes in a segment rigidly secured to the bed. Ninety positive feeds are possible, five for each standard thread which the lathe will cut, these ranging from 8 to 228.

The driving shaft of the feed changing mechanism is

the three-speed countershaft which is used with the machine, there are thus 27 possible spindle speeds, 18 of which are geared.

A reverse motion is fitted to the head operated by the handle located at the right side of the apron, so that the feeds either for screw cutting or turning can be instantly thrown out or reversed. A system of levers connects from the operating handle to three gears in the head. These are set in action by shifting a splined shaft in much the same manner as the quick change feed mechanism is operated. The handle slides the spline into one or the other of the two outside gears of the set of three, giving either a forward or reverse motion, while in the center gear the neutral position is obtained and the spindle does not revolve in either direction. The usual mechanism for accomplishing this same result employs a clutch.

This lathe may be furnished with an attachment for turning pulleys, by using which it is claimed that at least 100 12 x 5 inch pulleys can be turned in ten hours, taking a roughing and a finishing cut on each, that the

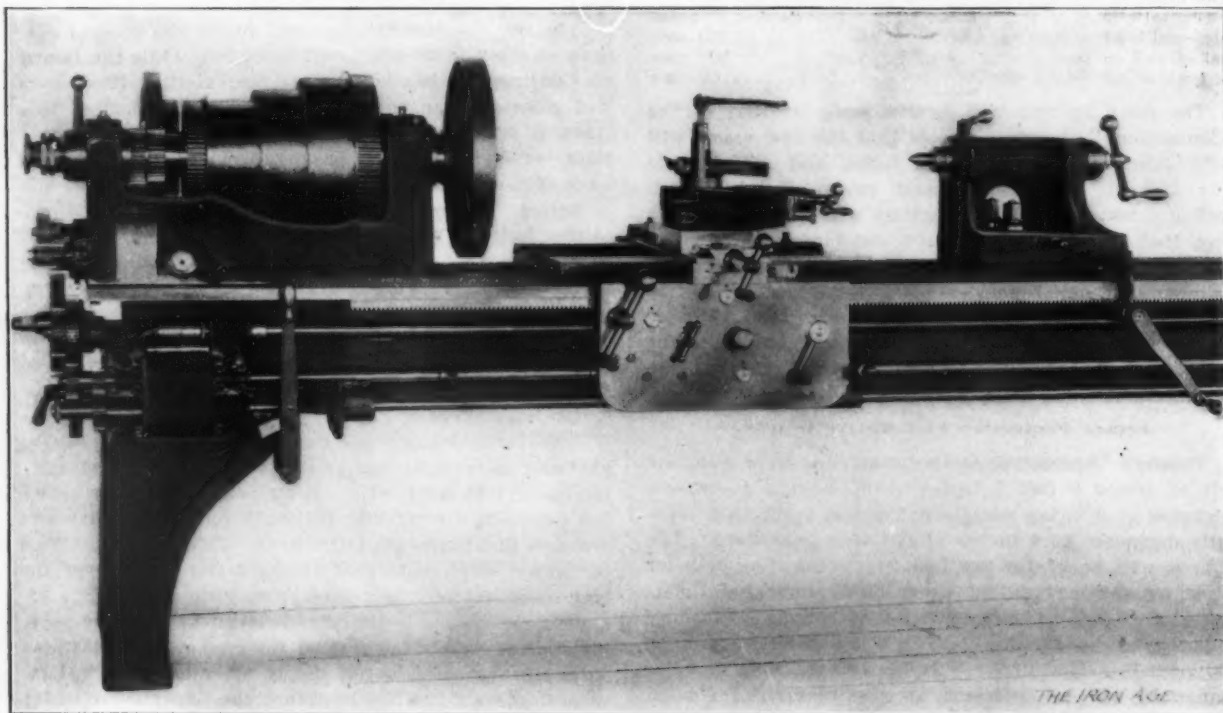


Fig. 1—The New Blaisdell Special High Speed 20-Inch Lathe.

driven at its left hand end by a train of gearing from the main spindle. This shaft is hollow part of its length and contains a pivoted key, the outer end of which is caused by a compression spring to project through a slot in the shaft. The five driving gears revolve loosely upon this shaft. These gears are provided with recessed keyways, which do not extend through to the outer faces of the gears. The ends of the keyways are inclined, so that the key may be withdrawn by a lateral movement of the actuating rod. The key naturally cannot be engaged with more than one gear at a time, as might be possible if it was drawn straight through from one gear to another. With this arrangement, the key when passing from one gear to another becomes flush with the shaft and ceases to be engaged with one before it finds the keyway of the next. The clutch shown just above the mechanism is that used to throw out the lead screw when the splined feed shaft is in use, and vice versa.

The new friction for the lateral feed, which is located in the apron, makes use of a split ring at each side of the apron, one being held in position by means of a tapered screw, which is also used for adjusting. The other side is tightened and loosened by means of a scissors cam. This friction has proved to be very powerful. The driving pulley is a three-step cone and there are two rates of back gearing, $3\frac{1}{2}$ to 1 and 12 to 1. In connection with

completed work will be accurately crowned with both edges rounded and that all will be the same diameter to within 0.003 inch.

Two striking teamsters, members of the Boston union, last week were given terms in the House of Correction—one for two years, the other for six months. In both cases nonunion teamsters were the victims of unprovoked assaults, but in neither instance were the injuries inflicted of a serious nature. The Court held that assaults of this description should not be classed with the ordinary broil, but should be considered in the sense of the deliberation in which they were committed, in the face of a full knowledge of the legal rights of the victims.

In the recent steam locomotive tests at Zossen, which have been compared with the previous electrical tests, it is estimated that the train of five cars and an engine weighed 330 tons, and used at full speed no less than 1400 horse-power. The passenger accommodations gave seats for 168 persons, and the cost figured 20 cents per passenger mile. Against this, the electric train of four trailers and the motor car weighed 260 tons, and used 1000 horse-power. The accommodation gave seats to 180 passengers, and the total cost per passenger mile was 18.4 cents. Both of these results point to the extreme

cost of high speed travel, and emphasize the fact that while such speeds are by no means impossible, no railroad company is justified in running its trains at such velocities until the public is in a position, financially and mentally, to pay for the service.

The Mining Engineers at St. Louis.

The American Institute of Mining Engineers, after having spent ten days in the Lake Superior iron and copper regions, met at its headquarters at Block 74, Mines Building, at the World's Fair, St. Louis, at 2 p.m., Saturday, September 24. On Saturday morning the members had attended the Mining Engineers' section of the Art and Science Congress at the Hall of Congresses, which was being held at the World's Fair during the same week.

The meeting of the institute was presided over by Prof. R. H. Richards of Boston, who was introduced by the chairman of the local committee, Arthur Thacher.

Testing Plant, in the Mining Gulch, was given by E. W. Parker of Washington, D. C.

On the following day a private view of the exhibits in the Mining Building was given by Dr. J. A. Holmes, chief of the Department of Mines and Metallurgy, in which he was assisted by his staff. After the inspection, addresses were made by Gov. David R. Francis, president of the St. Louis Exposition, and by F. J. V. Skiff, director of exhibits, to which a very happy response was made by Secretary Raymond. Mayor Rolla Wells of St. Louis was also present, but time did not permit of his making a speech. At one o'clock luncheon was served in the Assembly Hall of the Mining Building, that was attended by about 200 members with their ladies and friends. R. E. Hughes, the secretary of the Kentucky State Commission, kept open house at the Kentucky space on Block 63, and maintained the well-known reputation of Kentucky for its hospitality. An amusing diversion was offered by the local committee, assisted by a band of pygmies or cannibals from the Congo States in South Africa. They

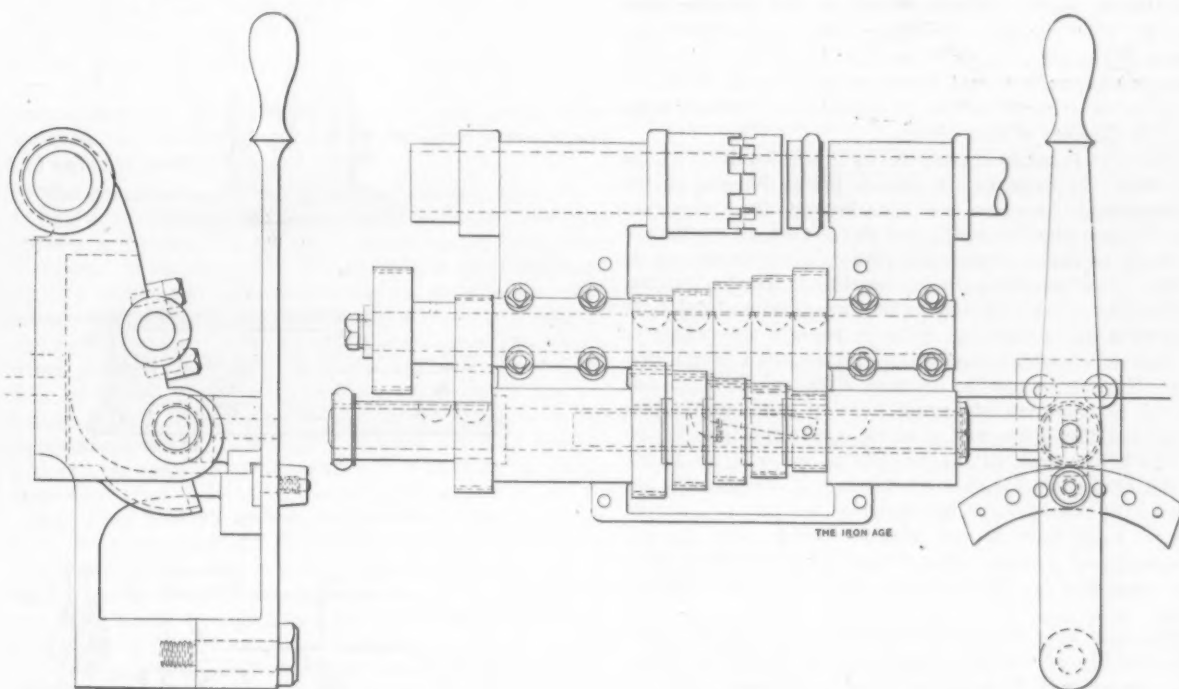


Fig. 2—Detail of the Quick Change Feed Gear Mechanism of the New Blaisdell Lathe.

Dr. R. W. Raymond, secretary, announced that the autumn meeting of the institute would be concluded with this St. Louis session.

An address of welcome was made by Dr. Joseph A. Holmes, chief of the Department of Mines and Metallurgy, in behalf of the St. Louis Exposition. Announcements of the evening programme and for the entertainment of the visitors on Sunday were then made by the local secretary, Prof. H. A. Wheeler.

A discourse was given on the lead resources of Missouri by Arthur Thacher of St. Louis. Abstracts were read of papers on "The Ore Dressing Practice in Missouri," by O. M. Bilharz of Flat River, Mo.; on "The Joplin District of Missouri," by H. F. Bain of Washington, D. C., and on "The Fire Clays of Missouri," by Prof. H. A. Wheeler of St. Louis. Papers on "The Coal Resources of Missouri," by B. F. Bush of St. Louis, and on "Zinc Smelting in the West," by Herman C. Meister of St. Louis, were read by title.

The members were entertained in the evening by the Engineers' Club of St. Louis with a smoker, which was given in the Missouri State Building. This proved to be a most delightful social event that gave an excellent opportunity for the visiting members to meet the local engineers. The smoker was presided over by Col. J. A. Ockerson, president of the St. Louis Engineers' Club, and an address was given by Frank Klepetko of New York, on "The Mineral Resources of the United States." An interesting description of the United States Geological Fuel

were induced to show their sharp pointed teeth and give some amusing war dances and songs.

After luncheon the visitors were taken through part of the Mining Gulch to inspect the Metal Pavilion, Model Foundry, United States Fuel Testing Plant and the American Portland Cement Association's attractive pavilion. Demonstrations were also made of the Goldschmidt thermit process. The day was concluded by an automobile trip given by the local committee through the World's Fair and the residential portion of St. Louis.

The National Steel Foundry Company, New Haven, Conn., elected the following list of officers at its annual meeting: President and treasurer, H. Stuart Hotchkiss; vice-president, Frederick B. Farnsworth; secretary, Eugene Buckman; manager, Mirabeau Sims; directors, these officers and H. Sanborn Smith, New York; Everett B. Webster, Boston; Henry L. Hotchkiss, Louis H. Bristol and Eugene A. Bristol, all being of New Haven, excepting where otherwise specified.

Iron pipe dipped in liquid asphaltum is said to be better protected than when coated with coal tar or pitch. Asphaltum is cheaply produced as a by-product from the California oil wells. A pipe coated with this material, which was laid underground for conveying salt water, was found after six years to be uninjured, not having been attacked either inside or outside.

Oil Burning Furnaces.*

In the last 18 months all of the coal heating furnaces in our rolling mills, as well as the larger reverberatory furnaces used for large locomotive and marine forgings, have been converted into oil burning furnaces. The smaller furnaces in the bolt and nut factory and the forging machine furnaces have also been converted into oil burning furnaces. The main question to be considered in comparing coal with oil for use in reverberatory furnaces is economy. This is governed by the price of fuel oil compared with coal, as well as many other conditions that present themselves regarding economy.

The first question to be considered is the number of gallons of crude oil required to bring 1 ton of scrap iron, put up in piles varying from 200 to 1000 pounds, to a welding heat. For a rolling mill in the Sacramento shops it requires 40 gallons of crude oil as it comes from the well (14 gravity) to heat 2000 pounds of scrap material or pile. In our old coal reverberatory furnaces it required 500 pounds of bituminous coal to heat the same quantity of metal. Furnace coal in this locality costs from \$5 to \$6 per ton, oil costing 1 cent per gallon; consequently the oil costs us 40 cents to heat 1 ton of metal, while with our old coal furnaces it costs us \$1.25 to bring the same metal to the required heat, or 68 per cent. saved in the cost of fuel alone.

The next thing to be considered is the handling of the two fuels. It requires six men to bring the coal to the reverberatory furnaces and bolt factory from the coal pile. This alone costs \$12 per day. Our oil tanks are arranged so that one man distributes oil over the whole works. Another thing to be considered is the hauling away of the ashes and cinders that are produced daily. It requires a horse and cart daily to remove this waste to the dumps. Another important consideration is the fireman. He has to handle between 5000 and 6000 pounds of coal daily, clean his grate bars at noon and night, shovel out the ashes and cinders, and oftentimes knock out the brick work in the fire chamber trying to knock off the clinkers. All this hard labor is reduced 75 per cent. by the use of oil. The output of the furnaces heated with oil is at least 20 per cent. more than with the old fashioned coal furnace. One reason for this is that there is no time lost in cleaning grate bars and wheeling out ashes.

The most important question relative to the two fuels is the quality of the iron produced from the scrap material. Hammered iron for railroad appliances, such as locomotive forgings or for any other purpose where the metal is subject to compression, tensile and vibrating and torsional strains, produced from oil fuel, is far superior than similar metal produced in the old style furnaces. Scrap material heated with oil shows less defect in working by lamination than iron brought to a welding heat with coal. We have had 50 per cent. less car axles condemned on account of seamy journals since we have adopted fuel oil in heating. This not only occurs with axles, but with all other forgings.

With oil at 6 cents per gallon and coal at \$5 per ton, the cost of operating a furnace about balances. Another important factor in the expense of operating is the power required to atomize the oil and furnish sufficient oxygen to produce perfect combustion. Compressed air I find to be an expensive commodity. Steam is also expensive, and is not as good as compressed air for the purpose. The old fan blast is the cheapest and best when properly applied. From 8 to 10 ounces pressure is all that is required for atomizing and perfect combustion. The success of oil burning depends on the shape of the interior of the furnace. In many cases the old method of providing a combustion chamber about 4 or 5 feet from the bridge wall, introducing the oil at the same end of the furnace, and the heated gases passing over the bridge wall and coming in contact with the metal, the waste gases passing through the flue, is used. The oil is forced into the furnace with compressed air or steam. Openings are left in the lower portion at the end of furnace, permitting the air to be drawn in. Another method is to

carry the back wall 4 or 5 feet back of the original bridge wall, and build up several courses of perforated brick work a little above the opening made in the lower portion of the end of furnace, for the purpose of heating the air that is drawn in to form better combustion. After examining all the small bolt furnaces, I concluded to try a different shape reverberatory furnace from any now in use. As an experiment I built the bridge wall up to and joining the roof, cutting out the old coal fire place, building the roof straight near to the flue. Then I built a perpendicular wall down to the flue, introducing the burner about 7 inches from the roof, as shown herewith.

I lit the furnace using compressed air, and after one

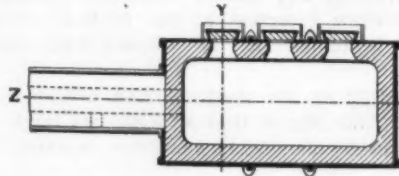


Fig. 1.

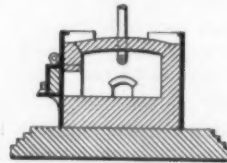


Fig. 2.

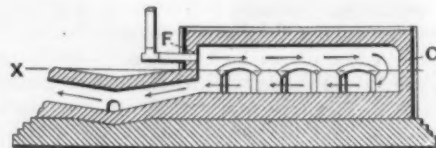


Fig. 3.

Reverberatory Heating Furnace.

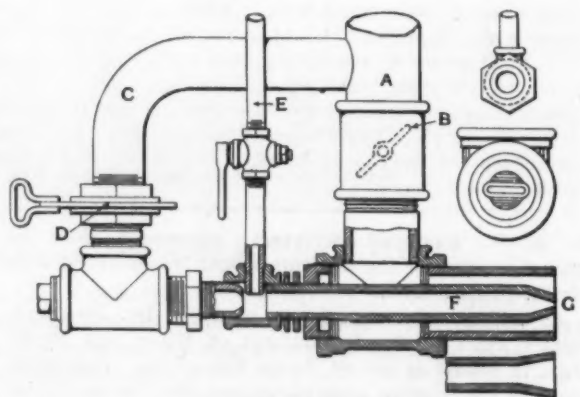


Fig. 4.

Low Pressure Oil Burner.

OIL BURNING FURNACES.

hour the heat was so intense that the slag commenced to pour through the slag hole. We then tried steam instead of air, with good results in heating the iron. We still use the fan blast to furnish oxygen for combustion. Finally the fan blast was used exclusively for combustion as well as for an atomizer. I find this method gives the best results. This furnace can be operated with compressed air, steam or the ordinary fan blast; however, I find the fan blast preferable. The same burner will answer in either case.

Fig. 1 in the accompanying illustration shows a horizontal section of the furnace through X of Fig. 3. Fig. 2 is a vertical transverse section taken through Y of Fig. 1. Fig. 3 is a longitudinal section taken through Z of Fig. 1. The burner passes through an aperture in the

* Extract from a paper read by S. Uren (Southern Pacific Railway) before the National Railroad Master Blacksmiths' Association, Indianapolis, August 18, 1904.

brick wall F, directly over the flue, blowing the oil in over the metal.

The furnace is 3 feet beneath the hearth and furnace roof, this height giving plenty of room for perfect combustion by the time it reaches the wall C. A perfect incandescent flame then returns by the draft of the flue, as shown by the arrow points, and when mixed with the metal to be heated, the waste gases can be diverted under the boiler for producing steam or through a stack, as desired. Much care should be taken in placing the burner direct in line and about 7 or 8 inches below the roof, so that perfect combustion will take place before the oil comes in contact with the iron on the hearth or the heated walls of the interior of the furnace. Should the oil come in contact with the roof or side walls, lumps of carbon will form, diverting the flame to such an extent that it will not flow in the direction required. The reason I mention this is that I had an unfortunate experience in this regard with my three-door rolling mill furnace. Through some accident the burner lowered on the outer end, causing the oil to strike the roof. A lump of carbon formed, diverting the flame toward the flue to such an extent that we could get the iron to the proper heat at the flue door only. As soon as the carbon was removed and the burner placed in the right position we had no more trouble.

The furnace shown in the illustration is a three-door rolling mill furnace. All our forging furnaces have two doors only, operated by the same method as the three-door furnaces. From my point of view this is the most simple and economical furnace now in use, as it is a perfect reverberatory furnace. Perfect combustion is produced and not a shadow of smoke can be seen from the stacks when properly manipulated. J. G. Camp, general foreman of the S. P. shops at Sacramento, designed the oil burner, Fig. 4. This burner is used in 13 furnaces in the Sacramento shops. It is known as a low pressure burner, and can be operated either with a fan blast as an atomizer, with from 7 to 10 ounces of pressure, or it can be operated with steam or compressed air. When steam is used as an atomizer the blast pipe C should be removed and a steam pipe substituted. When compressed air is used a similar change should be made. A represents the fan blast pipe; B, regulating gate in blast pipe; C, air pipe leading from blast pipe to the outer end of burner pipe; D, gate to regulate the blast passing into the burner pipe; E, oil pipe connecting the burner pipe; F, oil and wind pipe or burner pipe; G, outlet to oil and burner pipe.

Liberal Drawback Decisions.

WASHINGTON, D. C., October 4, 1904.—The Treasury Department has made an interesting decision in which the letter of the drawback regulations has been waived to prevent hardship to a large manufacturer of machinery who recently exported a number of machines made in part from imported steel plates and bars. The decision reflects the present policy of the Department not to stand on technicalities in the administration of the drawback law provided the revenues are in no way imperilled.

In the case upon which the Department has just ruled the first notice received by the Customs Division was an application from the Collector for the payment of the drawback alleged to be due upon an exportation of machinery of considerable size. An examination of the records of the Department showed that the manufacturer, who was also the exporter, had never applied to the Department to fix a rate of allowance in accordance with the standing regulations. Until quite recently this failure to make a formal application for the issuance of a special regulation would have been fatal to the drawback claim, but the Department has liberalized its practice with regard to drawbacks, and in this case it was decided to waive the requirement as to the application to the Department, provided it could be shown that the manufacturer was able to trace the imported material from the custom house into his own possession, that the drawback entry for exportation had been properly made, and the articles exported inspected by an official competent

to determine their character and value. These points having been determined to the satisfaction of the Department, the claim has been taken up for examination with a view to preparing a regulation fixing the rate of allowance. When this has been established the claim will be paid in due course. In this connection the Department calls attention to the provisions of the amended drawback regulations with reference to applications for a rate of allowance, the examination of which by manufacturers and exporters will save misunderstandings and vexatious delay in the settlement of drawback claims. These provisions are as follows:

No drawback shall be paid on any article of domestic manufacture exported until the rate of allowance has been established.

Application for the establishment of a rate shall be made to the Secretary of the Treasury. Such application shall contain a detailed statement, verified by oath or affirmation, showing the kinds of articles intended for exportation, the kinds and quantities of imported materials used in the production of each particular article, the rate of duty paid on such material, and such other data as will enable the Department to determine, first, whether or not the foreign materials so appear in the article to be exported that the quantity of each such material can be readily ascertained, and, second, the rate of drawback thereon.

Where manufactured articles shall have been exported after compliance with all the requirements of timely entry, inspection, supervision of lading, &c., the Department will consider a request to waive the requirement of application.

While the Department is willing to consider requests to waive the formality of an application for a rate of allowance, it desires it understood that in all cases some good reason must be presented to account for the failure to make such application. It is doubtful whether the Department would waive the requirement more than once in the case of any manufacturer or exporter.

The Treasury officials are giving some attention to the prospect for the passage at the coming session of the Lowering drawback bill or some other measure designed to do away with the vexatious requirements of the present statute. Secretary Shaw is already on record as endorsing a measure that would embody the general provisions of the French law, which permits the transfer of certificates of origin and the substitution of domestic materials of equal value with those imported. Owing to the shortness of the coming session prompt and energetic measures will have to be taken to secure the enactment of any law affecting drawbacks.

The Department has prepared a series of regulations upon the application of the J. H. Horne & Sons Company, South Lawrence, Mass., for the allowance of drawback of duty paid on rough steel bars used in the manufacture of finished steel roll bars intended for export.

In liquidation the weight of rough steel bars which may be taken as a basis for allowance of drawback may equal the quantity consumed as declared in the drawback entry, but in no case shall it exceed the net weight of the exported material, officially verified, with 3 per cent. of such weight added thereto to compensate for loss incurred in the manufacture.

W. L. C.

British Civil Engineers in Chicago.—Members of the British Institution of Civil Engineers to the number of 75 were guests of the Western Society of Engineers, Chicago, on Wednesday, Thursday and Friday of last week. Their arrival in Chicago six hours late somewhat shortened their first day's programme, which included Marshall Field's retail store, at the tea room of which establishment luncheon was tendered the guests by the Engineers' Club of Chicago. On Thursday the party split up, one section taking a steam launch on the Chicago River, while another section inspected new buildings in process of construction and the central station and tunnel of the Illinois Tunnel Company. Friday was devoted to a tour through the Illinois Steel Works at South Chicago, the stockyards and the drainage canal. Luncheon was served by the Western Society of Engineers on the train returning from South Chicago. The ladies of the party were also entertained, their itinerary including a tour of the large retail mercantile establishments in the city and an automobile ride through the parks, including luncheon at the Saddle and Cycle Club.

The Production of Petroleum in 1903.

WASHINGTON, D. C., October 4, 1904.—The great increase in the use of liquid fuel during the past year lends added interest to the annual report of the United States Geological Survey on the production of petroleum in 1903, which has just been completed by F. H. Oliphant. The production of the year reached the enormous total of 100,461,337 barrels, being larger than that of any previous year and greater than that of 1902 by 11,694,421 barrels, a gain of 13.17 per cent. as compared with a gain of 27.92 per cent. in 1902 over 1901. The greatest part of the increase during 1903 was from the State of California, which in 1903 produced 24.27 per cent., or nearly one-fourth of the entire production. The increase in California in 1903 was 10,398,204 barrels. Next to California the largest gain in production was in Indiana, which was 1,705,515 barrels. Kansas showed a remarkable gain in production of 600,465 barrels, Kentucky and Louisiana showed gains of about 369,000 barrels each, Indian Territory gained 101,811 barrels and New York gained 43,248 barrels. On the other hand, there was a slight decrease of 128,086 barrels in Texas, and Ohio, Pennsylvania and West Virginia all showed decreased production, amounting to a total of 1,852,619 barrels. The largest decrease in production in 1903 was in Pennsylvania, and amounted to 708,724 barrels.

The official statistics reveal the fact that in the last six years there has been a very remarkable change in the percentage of the local production. The Appalachian and the Lima (Ind.) fields, which for many years produced all but a very small percentage of the whole, in the year 1903 produced only 55.38 per cent. of the total, as compared with 93.99 per cent. in 1898. The Appalachian and the Lima (Ind.) fields have continued regularly for the last ten years to produce about 55,000,000 barrels per year. California has increased its production since 1900 in the most remarkable manner, so that during 1903 it produced 127,921 more barrels of petroleum than did the States of Pennsylvania and West Virginia combined. Texas has also been a very important factor in bringing about the readjustment of the percentages of production.

When the total value of the production in 1903, which was \$94,694,050, is compared with \$71,178,910, the value in 1902, the former shows a gain of \$23,515,140, or 33 per cent. The production of Ohio was valued at \$26,234,521 in 1903, West Virginia at \$20,516,532, Pennsylvania at \$18,170,881, Indiana at \$10,474,127, Texas at \$7,517,479 and California, which produced the largest number of barrels of crude petroleum, was valued at only \$7,399,349.

The average price of all the petroleum produced and marketed during 1903 was 94.26 cents per barrel, as compared with 80.19 cents per barrel in 1902, an increase of 14.07 cents per barrel, as compared with a decrease of 15.51 cents per barrel when the value received for the production of 1902 is compared with that of 1901. For the last two years the increasing quantity of cheaper petroleum produced has had its influence in reducing the average price per barrel of the entire production, notwithstanding that much higher prices were paid for Eastern petroleum in 1903 than in 1902.

The average price paid for Pennsylvania petroleum, which is about 95 per cent. of the entire production of the Appalachian field in 1903, was \$1.59 per barrel, as compared with \$1.23, the average price paid in 1902. There was also a gain of about 27 cents per barrel in the price paid for the production in the Lima (Ind.) field during 1903, over that of 1902. On the other hand, the average price of California petroleum decreased from 34.8 cents per barrel for the year 1902 to 30.3 cents for 1903. The price of the Texas petroleum showed a large advance in the average price paid, as the production of 1903 averaged 41.87 cents per barrel, as compared with 22.1 cents for that of 1902, a gain of 19.77 cents, or 89 per cent. The highest price quoted during the year was \$7 per barrel for the lubricating petroleum produced in Wyoming.

The close of the year 1903 about completes the third

year since the discovery of the remarkable deposit of petroleum at Spindle Top, Texas, by the large flowing well drilled by Captain Lucas. Since then, within a radius of 30 miles from Spindle Top, there has been produced, including loss by fire and fuel consumption, not less than 40,000,000 barrels of crude petroleum. A large quantity has also been absorbed by earthen reservoirs. Since 1896 there has been a considerable production of a remarkably pure crude petroleum at Corsicana, amounting to 401,817 barrels in 1903, but the wells are small, and there has been a gradual decline since its maximum of 829,560 barrels of production was reached, in 1900. The rapid development of the Sour Lake pool, the increased production at Saratoga, the decline in the production of the original pool at Spindle Top and the opening of an entirely new pool, known as Batson's Prairie, near the close of 1903 are among the important events in the industry of this State during the last year. The entire production of the State in 1903 was 17,955,572 barrels. In that year Texas ranked third in quantity of production. A very large proportion of the oil produced in Texas in 1903 was consumed either in that State or Louisiana and a large quantity of the oil was employed by the railroad companies as fuel for oil burning locomotives, one company having since 1901 equipped 212 locomotives with oil burners and tank tenders.

The most important event connected with the output of petroleum in the United States in 1903 was the remarkable increase in the production of California and its sudden elevation to head of the States producing petroleum, superseding Ohio, which for several years previous ranked first. When values are compared, however, California's rank is sixth, being slightly less than that of Texas. The total State production was 24,382,472 barrels in 1903. The greater portion of the increase came from Kern County, which, almost doubling its former large output, produced over 74 per cent. of the total. The successful introduction of petroleum fuel on the Pacific coast has caused a rapid decline in the importation of coal. The problem of cheap fuel has been solved. The railroads, the manufacturers and the steamship lines are being directly benefited by its general introduction as an economical and perfect fuel.

The table presented below gives the number of barrels of petroleum equivalent to 1 ton of the coal usually found in the San Francisco markets, the cost of petroleum being estimated at \$1 per barrel. If the cost is more or less than \$1 per barrel the figures in the third and fourth columns can be changed proportionally. The third column gives the price that the purchaser can afford to pay for coal per ton to equal the fuel value of petroleum at \$1 per barrel. The fourth column shows the reduction in cost of the fuel, due to the cheaper handling of petroleum.

	Pounds of water evaporated per pound of combustible.	Barrels of petroleum required to do the same amount of evaporation as ton of coal.	Cost of coal per ton to equal the petroleum at \$1 per barrel.	Less 10 per cent. owing to the greater economy in handling petroleum.
Petroleum, 15° to 18° Baumé.	16.0	..	..	..
Cardiff lump, Wales.....	10.0	4.0	\$4.00	\$3.60
Cape Breton, Canada.....	9.2	3.7	3.70	3.33
Nanaimo, British Columbia...	7.3	2.9	2.90	2.61
Co-operative, British Columbia	8.9	3.6	3.60	3.24
Greta, Washington.....	7.6	3.0	3.00	2.70
Carbon Hill, Washington.....	7.6	3.0	3.00	2.70

The enormous recent increase in the production of petroleum in California is one of the marvels of the industry. Ten years ago the output was but 705,969 barrels, or only a fraction more than 2 per cent. of the production in 1903. Unlike the Texas field, the output in California has been very economically managed and the oil reserve appears to be well nigh inexhaustible.

W. L. C.

Request for Catalogues.—Stricker & Co., Calvert, Texas, will be pleased to receive catalogues from manufacturers of fruit and truck canning machinery.

Steel Castings.

At a meeting of the Railway Club of Pittsburgh held on Friday, September 23, W. A. Herron, president of the Duquesne Steel Foundry Company, read a paper on steel castings. After describing the different processes of making steel, Mr. Herron said:

On account of the high temperature of the molten steel as it is run into the mold the latter must be made of a very refractory material. The material used is a pure silica sand, which is mixed in the sand mill with fire clay and molasses water to give it a bond. This mixture is used for the face of the mold, *i. e.*, the part that comes in contact with the casting, and back of this facing "heap" sand or sand from old molds is rammed. After the mold has been completed it is coated with a wash consisting of ground flint, molasses and water, to give the casting a good surface. It is then taken to the oven and thoroughly dried. From the oven it goes to the casting floor, where the cores are set, the molds closed, and the metal poured. The baking of the mold makes it very hard, and great care must be exercised to prevent the casting from checking, even if the composition of the steel be good, particularly in the case of castings having thin sections, or when, by reason of the design, strains are likely to be created due to unequal cooling.

Several precautions may be taken to prevent checking, among which are the cutting of thin slits at the proper places in the mold into which the steel runs, forming brackets which set quickly and strengthen the casting while it is cooling; the placing of iron rods in those places in the mold where strains will come in cooling; the cutting away of sand in the mold and the filling of the space so formed with cinders or sawdust, so that the mold will yield when the metal is contracting around it; the filling of the center of large cores with cinders or sawdust to soften them; the chilling of the steel by coming into contact with metal chills inserted into the mold, or with nails driven plentifully into the mold for the same purpose; the designing of the casting in such a way as to, as far as practicable, avoid undue variation in the thickness of the section of its different parts. Sometimes water is run through large cores, holes being left for the purpose, to cool the inside of the casting at the same time as the outside. In order to insure sound castings a sufficient number of feeding heads of good size should be used to permit the gases formed in the mold to escape and keep the mold full as the metal settles in cooling. In some cases it is well to tip the mold, *i. e.*, to raise one end higher than the other to force the gas out at the top as the metal rises from the lower end, where it enters, and to insure the mold running full of metal.

After the casting is shaken out of the mold it goes to the cleaning room, where the sink heads or grates are cut or broken off. The sand adhering to the casting is then removed; the casting is trimmed and ground and is ready for shipment. If it is to be used in a railroad car, or locomotive, or bridge, or some other place where it will be subjected to great strains or shocks, it should be thoroughly annealed to eliminate internal strains and to increase its ductility. If resistance to wear be the quality desired in the steel, annealing will not improve, but more likely injure it.

Green Sand Castings.

Small steel castings and castings of light sections are sometimes made in "green" molds, *i. e.*, in molds that are not baked. This method has the advantage of being somewhat cheaper, and because the molds are soft and yielding, internal strains are not so likely to be created as in the harder, dry molds, but castings so made are not so free from blowholes as those made in the dried molds, and are therefore not so satisfactory, particularly if they are to be machined, as the finishing process discloses the defects not otherwise apparent.

Inspection.

The inspection of steel castings as at present practiced leaves much to be desired. One inspector, using discretion, may accept a casting having slight external defects marring its appearance somewhat, perhaps, but impairing

its serviceability but slightly, if at all. Another, inspecting the same casting, fearing the criticism of his superior, will insist upon perfection and reject the casting. In one instance in the experience of the writer a railroad inspector rejected a lot of castings for external defects, in most cases scarcely discernible with the naked eye. An appeal was taken to his superior, who made a careful personal inspection of the castings and accepted practically all of them. In another instance a lot of bridge castings were accepted at the makers' works by the representative of an inspecting company, and, subsequently, a number of them were rejected at destination by another representative of the same company. The bridge company would have accepted the rejected castings, but the engineer of the railroad company would not receive them. There were thus four different inspections made, with alternate acceptances and rejections.

No reputable manufacturer will object to any reasonable inspection, but when a casting is once accepted it should not subsequently be rejected unless for defects developed during the process of finishing, and which render the casting unsafe to use.

Co-operation.

It is to the mutual advantage of the manufacturer and his customer that castings shall be furnished of a grade best suited to the use to which they are to be put and to that end there should be earnest co-operation. If the manufacturer be informed as to the requirements in any case he may make the steel a little softer or a little harder than the average, to suit the special conditions existing, and he will know whether or not the casting should be annealed. If he knows where the strains of service are to come he will be able to take especial precautions to have the vital point of the casting solid. In some instances castings must be turned out so close to given sizes that a little too much rapping of the pattern in the mold will entail extra expense for machining, or perhaps cause the rejection of the casting if it must fit in place without machining. If the founder be cautioned as to the requirements in such cases he can perhaps avoid the difficulty, or, with a little chipping and the use of rough gauges, correct it and thus prevent complaints and dissatisfaction on the part of the customer. If every pattern sent to the foundry were plainly marked so as to show what parts of the casting are to be machined it would be a guide to the foundryman, who can take precautions accordingly. An occasional visit of the buyer to the foundry and of the manufacturer to his customer's works should result in good to both through the familiarity each would gain of the other's work and methods.

Failures.

Every one should profit by his failures. So when a casting fails in important service the cause of failure should, if possible, be ascertained. If it be due to any weakness of the casting it should be known, so that a stronger one may replace it, or perhaps the design may be improved. The broken parts should be preserved, so that the maker as well as the user may make such tests as he may desire. When defects develop in the process of finishing which cause the rejection of a casting the manufacturer should have the casting returned for inspection before a new one is made, or if this be impracticable because of insufficient time, a sketch showing the location and nature of the defects should be furnished him, in order that he may avoid a repetition of the trouble in making the new casting. As an aid to such investigations all important castings should bear the manufacturer's mark for the purpose of identification. In cases where the foundry stamp or mark is obliterated in the process of finishing the castings should be restamped in the shop.

As a result of unpleasant and costly experiences with steel castings in locomotives some very intelligent and experienced railroad mechanics had reached the conclusion that some better material was imperatively needed as a substitute for steel castings, particularly of frames and wheel centers. If the cause of failure had been ascertained in each such case it would doubtless have been shown that if the material was not bad the castings were of poor design, or that they had not been treated in the foundry in such a manner as to give the best results.

Quality and Cost.

The buyer of steel castings who changes with every wind, now buying from one foundry and then from another, looking always for the lowest price, is not the one who may expect the best of service. Co-operation in such a case is impracticable. The expectation of a continuance of patronage is the incentive needed by the manufacturer to incite him to his best endeavors. Familiarity with his customer's requirements enables him to better supply that customer's wants, and such knowledge comes through length of service. In such important service as in locomotives and cars, where a broken part may cause loss of property and endanger human lives, the first consideration should be safety and the constant endeavor should be to secure not the cheapest, but the best.

In the construction of locomotives, except those of small size, or ones intended for yard service, practically none other than steel castings are now used. And cast steel has displaced not only cast and malleable iron in important service, but the tendency is also toward its substitution for forgings. The committee of the Master Mechanics' Association that recommended at the recent meeting at Saratoga the adoption of the cast steel locomotive frame rather than the forged frame was alive to the fact that cast steel made of good materials and properly annealed is the strongest and cheapest material that can be used in the construction of locomotives, and since the report of that committee was made the prejudices against cast steel that had existed through misunderstandings in some minds have been visibly reduced, if not entirely eradicated.

The reasons given by the committee for its recommendation are as follows:

The tensile strength of the steel suitable for frames is about 75,000 pounds per square inch, as compared with 53,000 to 54,000 pounds per square inch for the best hammered iron.

The cast steel frame is practically homogeneous—that is to say, there are no welds, and it is of a uniform texture throughout its entire length.

The number of projections required for the reception of brake work, tumbling shafts, rocker pins, &c., seriously contemplates the production of modern frames in hammered iron, whereas the reverse is true in the manufacture of cast steel frames.

Generally speaking, steel is intrinsically superior to wrought iron, and all the difficulties experienced with cast steel are mainly chargeable to either design or method of manufacture and not to the steel *per se*.

To which should be added the further reason that a considerable saving in the cost of locomotive frames may be effected by the substitution of cast steel for wrought iron.

Vulcan Octagon Extra Steel in Drill Contest.—Recently at Wardner, Idaho, one team of two men drilled 33 inches and another team drilled 32½ inches in close hard granite in 15 minutes, both teams using ¾-inch octagon Vulcan Extra steel, made by the Vulcan Crucible Steel Company, Aliquippa, Pa., and which in no instance broke or failed. The next best contesting team drilled 28 inches, which equals the best record heretofore made in the same granite. It may be stated that these contests are held frequently throughout the West, and are made between the leading brands of tool steels. As the Vulcan Crucible Steel Company has only been established in the Western trade about nine months, and this is the first contest in which it has entered, the concern naturally feels highly satisfied over the success achieved. This is not only demonstrated in the above test, but in the large trade which the company has secured through its branch house in Denver, Col., which is in charge of P. P. Bush.

At a meeting held September 28 the temporary Board of Directors of the United States Realty & Improvement Company was retired and a permanent board elected, consisting of James Stillman, P. A. Valentine of Chicago, H. S. Black, J. W. Gates and R. E. Dowling. This board then elected officers of the company as follows: President, H. S. Black; vice-president, R. E. Dowling; secretary and counsel, R. G. Babbage; treasurer, B. M.

Fellowes. It was voted to increase the membership of the Board of Directors from five to eighteen at the next stockholders' meeting, which has been called for October 12. The necessary change in the company's by-laws to make possible this increase will be enacted at the meeting.

Production of Open Hearth Steel in 1903.

The American Iron and Steel Association has received virtually complete statistics of the production of open hearth steel in the United States in 1903. The production was larger than in 1902 or any preceding year.

The total production of open hearth steel ingots and castings in the United States in 1903 was 5,837,789 gross tons, against 5,687,729 tons in 1902, an increase of 150,060 tons, or 2.6 per cent. As compared with 1898, six years ago, when the production of open hearth steel amounted to 2,230,292 tons, there was an increase in 1903 of 3,607,497 tons, or over 161 per cent. The following table gives the production of open hearth ingots and castings, by States, since 1900:

States.	1900. Gross tons.	1901. Gross tons.	1902. Gross tons.	1903. Gross tons.
New England.....	74,522	170,876	179,923	169,209
New York and New Jersey	67,361	82,985	92,763	104,598
Pennsylvania	2,699,502	3,594,763	4,375,364	4,442,358
Ohio	130,191	184,943	278,854	369,249
Illinois	285,551	398,522	435,461	422,919
Other States.....	141,008	224,220	325,364	329,456
Total.....	3,398,135	4,656,309	5,687,729	5,837,789

The open hearth steel made in 1903 was produced by 111 works in 17 States—Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Delaware, Maryland, Tennessee, Alabama, Ohio, Indiana, Illinois, Wisconsin, Missouri, Colorado and California. Ninety-eight works in 16 States made open hearth steel in 1902. The States which have open hearth furnaces but which did not produce open hearth steel in 1903, were West Virginia and Kentucky.

In 1902 4,496,533 tons of open hearth steel were made by the basic process, and 1,191,196 tons were made by the acid process, while in 1903 the production by the basic process amounted to 4,741,913 tons and by the acid process to 1,095,876 tons. In the following table the production by States of both acid and basic open hearth steel ingots and castings in 1903 is given:

States.	Basic open hearth steel. Gross tons.	Acid open hearth steel. Gross tons.	Total. Gross tons.
New England.....	105,778	63,431	169,209
New York and New Jersey.....	71,537	33,061	104,598
Pennsylvania	3,557,493	884,865	4,442,358
Ohio	308,575	60,674	369,249
Illinois	390,513	32,406	422,919
Other States.....	308,017	21,439	329,456
Totals.....	4,741,913	1,095,876	5,837,789

There was a decrease in the production of acid steel in 1903 as compared with 1902 of 95,320 tons, or a little over 8 per cent., but an increase in the production of basic steel of 245,380 tons, or almost 5.5 per cent.

The total production of open hearth steel castings in 1903, included above, amounted to 384,809 gross tons, of which 134,879 tons were made by the basic process and 249,930 tons were made by the acid process. In 1902 the production of open hearth steel castings amounted to 367,879 tons, of which 112,404 tons were made by the basic process and 255,475 tons by the acid process. The following table gives the production of open hearth steel castings by the acid and basic processes in 1903 by States:

States.	Basic castings. Gross tons.	Acid castings. Gross tons.	Total. Gross tons.
New England. New York and New Jersey.....	5,311	30,783	36,094
Pennsylvania	14,483	150,749	165,232
Ohio, Illinois and other States..	115,085	68,398	183,483
Totals.....	134,879	249,930	384,809

In addition to the States enumerated in the table Massachusetts, Connecticut, Tennessee, Alabama, Indiana, Wisconsin, Missouri and California made open hearth steel castings in 1903.

St. Louis World's Fair Notes.

The display of carborundum in Machinery Hall forms one of the very interesting exhibits at the World's Fair. A whirling pyramid of carborundum crystals scintillating all the colors of the spectrum forms the center of the exhibit, and grouped about it are numerous evidences of its usefulness. The story of the discovery of carborundum by Edward G. Acheson in 1890 is still unfamiliar to many and is told daily to scores of interested hearers. When it was first offered as a commercial product the price was \$450 a pound, on account of the limited supply and the insufficient manufacturing facilities. These have since been so developed by the Carborundum Company, Niagara Falls, N. Y., that it is now made in immense quantities. Last year over 5,000,000 pounds were produced, and this year the production will probably exceed 8,000,000 pounds. Besides the many forms in which carborundum is utilized, the exhibit contains several examples of the work it does. Among these is a partly ground 24-inch chilled iron roll from the J. T. Noye Mfg. Company, Buffalo, N. Y. One of the wheels used by this company had a contents of 60 cubic inches and removed during its life 8,710 cubic inches of iron. It is said a carborundum wheel will accomplish its work in about one-third of the time required by a steel tool. That it may be used on soft material as well as hard is demonstrated in a soft rubber roller lent by the American Wringer Company, which was fashioned by carborundum. Shoes and leather goods which have been worked by the abrasive are also shown, and the International Harvester Company has sent a mower knife that was sharpened with it. The manufacture of carborundum is interesting. It is formed by fusing at a temperature of 7500 degrees sand, coke, salt and sawdust, and the result is the perfect crystals of carborundum. These are then ground and assorted by size into 29 different grades, which are next combined into the various shapes in which it is used. The crystals are held together by an adhesive made of kaolin and water, being pressed in molds under heavy hydraulic pressure, and finally baked for seven days in a heat which is slowly increased to 2500 degrees, followed by a gradual cooling process. The wheels at work are shown in the exhibit of the Landis Tool Company, adjoining the carborundum exhibit, and the substance is also shown as a part of the Niagara Falls exhibit in the Mining Building.

The Capewell Horse Nail Company, Hartford, Conn., has an interesting booth where various styles of horse shoe nails are shown. These include corrugated nails requiring no clinching, nails for city use, lighter nails for soft country roads, and still more delicate nails for track use. All are made of the same metal, which is so tough that a nail rolled out to a ribbon the thickness of heavy paper and 3 feet long shows no sign of weakness, and may be coiled to fit in a pill box, while on being released it springs out to its original straightness.

The Fulton & Walker Company, Philadelphia, Pa., has on exhibition in the Transportation Building a number of automobile ambulances. One of these is a style called the coupé front. This is arranged to open at the sides as well as the rear, so that if the patient is able he may step in as though entering an ordinary carriage. Inside the occupant may sit or recline, as preferred. The side opening gives the surgeon access to the head and shoulders of the patient. The regular hospital ambulances are equipped with all of the most modern and complete accessories and conveniences. The company also shows business vehicles for various purposes, mail wagons, delivery wagons, express wagons, &c.

In the exceedingly comprehensive and instructive exhibit of locomotives in the Transportation Building the visitor may profitably spend hours of his time. The freight traffic of the country has seen a remarkable growth in the past ten years, and the changes which have been occasioned in the locomotives to handle the heavier trains of to-day are very striking. Formerly a train averaged from 20 to 40 cars of 30 tons capacity each, whereas now trains of 60 to 100 50-ton cars are common. The requirements of passenger service have not been less exacting, though of a different nature. Speed is the all-important consideration rather than great tractive power.

One of the most interesting passenger locomotives is the one built by the American Locomotive Company for the Big Four, which is exhibited in motion, the engines being turned over by electric motors, while the whole is mounted on a continually revolving turntable. This is of the Atlantic type, having a four-wheeled front truck, four drivers and a pair of trailers. The weight of the engine and tender is 163 tons, and the weight on the driving wheels is 50 tons. Another locomotive of the same type is still heavier, having a weight of 55 tons on the drivers. It is a four-cylinder balanced compound, and is the most powerful passenger locomotive in the world. The fastest locomotives are of the Prairie type, the standard on the Lake Shore & Michigan Southern Railway. They develop a speed of 90 to 100 miles an hour. One of this type exhibited weighs, with its tender, 160 tons, 76 tons being the weight on the drivers. An example of the Pacific type is also present. The weight on the drivers, of which there are three pairs, is 61 tons, and the total weight with tender is 145 tons. These engines are designed especially for use where heavy grades are encountered and it is desirable to combine high speed and heavy tonnage. In the Baltimore & Ohio section the American Locomotive Company exhibits the heaviest freight locomotive in the world. It has a total weight of 239 tons, with 167 on its 12 driving wheels. This engine is intended for mountain service, and is of a most remarkable construction. There are no truck wheels or trailers, the entire weight being borne by the driving wheels. Naturally, the wheel base is very long, but the locomotive is capable of rounding short curves, as the frame is articulated so that each of the two sets of three pairs of wheels is independent of the other. This requires that each set shall have separate engine cylinders. The locomotive being a compound, the division is happily effected by connecting the high pressure cylinders with the forward set of wheels and the low with the rear set. The size of the monster boiler is emphasized by the dwarfed appearance of the upper fixtures—sand box, valve boxes and smoke stack, the latter being so short that it resembles a napkin ring in its proportions.

The most complete collection of firearms in the world is the interesting exhibit offered by the United States Cartridge Company of Lowell, Mass., in the Forestry, Fish and Game Building. In them it is possible to trace the gradual development in the art of gun making from the earliest times down to the present. The cases containing the arms are ranged in rows and numbered according to the period represented. Bow guns, flintlock muskets, blunderbusses and Oriental guns, with their long barrels and quaint stocks, many of them beautifully carved or inlaid, are among the interesting types to be seen. Other weapons are famous historically. One was dug up at Antietam after it had lain buried for 27 years; the stock was petrified and the barrel a mass of rust. Another is a rifle used by John Brown in the Kansas campaign, and still another one that was taken from Sitting Bull in 1876. But perhaps the most wonderful piece in the collection is a gun made in England in 1586 by John Cookson. It is beautifully chased and inlaid, and has a mechanism which was a marvel for its time, as it is breech loading and practically a magazine rifle. These improvements were not supposed to have been invented until centuries after.

Charles Churchill & Co., Limited, engineers and importers of American machine tools, London, England, were greatly annoyed some three or four years since by a person who traveled in this country, sometimes claiming to be the son of Mr. Churchill and sometimes the son of Lord Armstrong, and giving various other names. Publication of the imposture stopped his operations, but he has started again. Recently a New England manufacturer advised the firm that a man representing himself as the son of Mr. Churchill and the manager of the firm's Birmingham house, had endeavored to borrow money enough to get back to New York. The trade is warned against giving any consideration to either this person or others who may attempt to secure funds through a professed connection with Charles Churchill & Co., Limited.

The Ridgway Two-Belt Conveyor.

It is necessary to trough an endless belt when it is used for conveying material. This is usually done either by using sets of three supporting rollers (one horizontal

on the shafts. Furthermore, there is difficulty in keeping rollers lubricated on the inclined shafts of the three-roller system.

When, in the course of time, the carrier belt of the two-belt system requires renewal the cost of its renewal



Fig. 1.—Ridgway Conveyor with Troughing Blocks Ready to Receive the Carrier Belt.

and two inclined), or by using coned rollers. In either case the wear on the belt is more or less severe. If coned rollers are used, the bottom of the belt is subjected to the scouring action of the roller, which is greatest near the edges of the belt, the surface velocity of the roller being obviously greater there than at the center of the belt. If the three-roller system is used, the belt in time wears out along the line of intersection of the horizontal roller with the inclined roller, where the belt is bent. To overcome these causes of wear the "two-belt" system, herewith illustrated, was invented by John J. Ridgway.

Supporting rollers are used which do not run loose on shafts, but the shaft runs in bearings, thus materially reducing the friction and effecting more perfect lubrication. Fig. 1 shows the lower or supporting belt resting upon the rollers. Bolted to this belt will be seen the blocks that serve to support the carrier belt and to give it a trough shape. Fig. 2 shows the two belts traveling together over the rollers, the upper belt carrying the load of gravel or stone. A particularly noteworthy feature is the absence of deflection or waves usually seen where a single conveyor belt passes over rollers.

A side view and cross section are shown in Figs. 3 and 4. It will be seen, in the cross section, that the belt, which is troughed so as to carry the gravel or stone, does not run in the trough on its return, but is supported on the lower rollers and in turn supports the belt to which the troughing blocks are fastened. The side view shows that each belt has its own head pulley at each end of the conveyor, and that a chain running over sprocket wheels makes both belts travel precisely at the same speed, thus insuring complete absence of slip of the carrier belt on the troughing blocks. Near each head pulley is a troughing roller that lifts the carrier belt off the troughing blocks so as to obviate any rubbing at the moment the two belts separate.

With regard to the cost of such a system, the manufacturers state that the two belts used cost no more than the single belt used in other systems, because not only is each belt of lighter weight, but machine made belts are used, costing far less per foot than the hand made belts required to stand the wear incident to the one-belt systems. Moreover, it is claimed that the power plant of the two-belt system need not be so great as for the one-belt system of equal capacity, due to the fact that the rolling friction of rollers having shafts running in bearings is much less than the rolling friction of rollers loose

is obviously less than would be the case were a heavier and more expensive belt needed for this purpose.

Another advantage claimed for the light belts of the two-belt system is that the fewer the plies in a belt the



Fig. 2.—Ridgway Conveyor in Use, Showing Absence of Deflection.

longer its life when subject to bending. When a belt passes around a pulley its outer fibers are in tension and its inner fibers in compression; the thicker the belt the greater the stresses in the extreme fibers, consequently the greater the tendency of one ply to "creep" upon the

next ply, and thus in time to break the bond between the successive plies of the belt. To minimize this effect a belt should be as thin as possible, consistent with strength—an object which is attained in the two-belt system, where the load is divided between two light belts.

The advantages claimed for the two-belt system as compared with the single belt systems of conveying are thus enumerated: 1, the conveying system is lighter; 2, it is self lubricating and has dust proof bearings; 3, as a consequence of the two foregoing factors, less power is required; 4, when the carrier belt requires renewal the cost of a new belt is approximately one-half as much as the renewal of the best type of single conveyor belt; 5, the

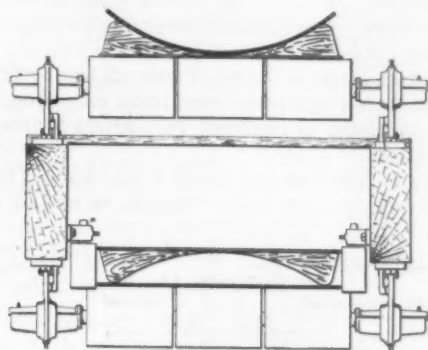


Fig. 3.—Cross Section of the Ridgway Two-Belt Conveyor.

bending strain due to the load on the belts is distributed so that both belts run with practically no sag between the rollers; 6, in consequence of the foregoing factor the life of both belts is longer than with other systems, in spite of the fact that lighter and cheaper belts are used. The manufacturer of this system is the Ridgway Belt Conveyor Company, 29 Broadway, New York City.

Central American Notes.

SAN JOSÉ, C. A., September 15, 1904.—The re-election of President Estrada Cabrera in Guatemala has given renewed life to business of all kinds in that country, and it is now confidently expected that this will serve to stimulate work on the Northern Railway, thus making

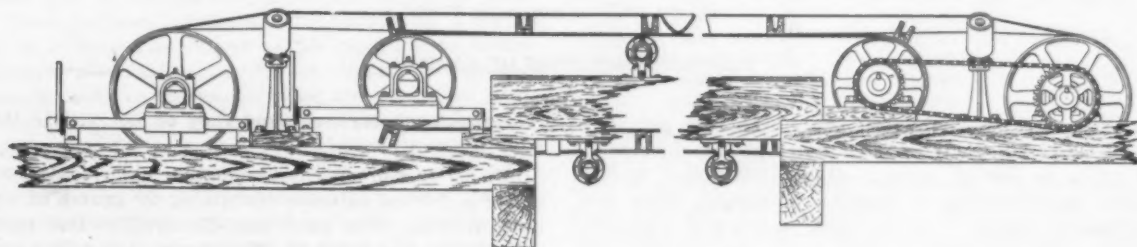


Fig. 4.—Side Elevation of the Ridgway Two-Belt Conveyor.

it possible for the American contractors to finish the line to the Pacific within two years. Contracts for the branch line which will connect Salvador with the Atlantic are now being let. Once this branch is completed it will place Salvador 1500 miles nearer to New York. The exhibits sent by all these countries to the Louisiana Purchase Exposition at St. Louis are creditable and comprise hundreds of varieties of precious woods of many unknown kinds, coffee, spices, fruits, cotton, gold, silver, copper, iron, lead, zinc, opals, &c.

The recent cyclone on the Pacific Coast swept away the pier ends at Champerico, as well as a number of barges and cargo boats. It is the intention of the pier company to use steel throughout in the repairs and to extend the length of the pier. Quezaltenango, the second city of the Republic of Guatemala, is rapidly coming to the front again, the shipments of coffee from the district having been very large. New buildings for the municipality and government offices have been erected, many

of them being of steel and corrugated iron, this having proved to be the best anti-earthquake material in the several shake-ups they have had in Salvador. It is expected to connect the whole section with the Pacific by rail within a year and a half. Quezaltenango, Retalhulen, Mazatenango and several other nearby towns already have electric lights, telephones and telegraphs. New market places with iron buildings are to be erected by the government in the first three named places.

At Panama some friction with the American authorities has been engendered, due to the postal regulations for the islands of Culebro, Perico and several others, which the natives claim should not be under the jurisdiction of the United States. But it is believed this matter will soon be arranged amicably. The new monetary law is working well, and, as it is based on the American system, it greatly facilitates business with our country. It is probable that the Colombian coinage will quickly disappear from circulation.

An American contract has nearly brought Nicaragua and Honduras to the verge of war. Nicaragua gave a concession to the Diedrich syndicate to mine in the Cabo de Gracious and Cocos districts, as also to navigate the Wanks River. All this happens to be in a disputed zone on the boundary of Honduras. But lately a meeting of the presidents was held and the matter left to arbitration. It is understood that the Diedrichs paid \$100,000 for the rights to work in the district mentioned. In Honduras the Western gold mines have been abandoned by the Goslings, but a new company has now taken hold and will bring in American machinery to do the work. The gold is found in thin sheets and scales in the quartz rock.

There are many new enterprises starting up in different parts of Central America in connection with the Panama Canal work. This is natural, and business will increase daily, because Panama, with its extreme heat and fever conditions, can never become a base of supplies. C.

When the Russo-Japanese war is over it will be highly interesting to obtain complete and authoritative reports of the methods and the success obtained through the use of the Goldschmidt thermite in making repairs. It is reported that very large quantities of thermite have been repeatedly purchased and have been shipped to both the Russian and Japanese navies. Just in what manner and

to what extent the thermite has been used to repair injuries to the hull and to the machinery of the fighting ships is not known as yet.

Experiments with several kinds of smokeless powder of various forms have been begun at the United States Proving Ground, at Indian Head, Md. The preference thus far seems to be for the macaroni shaped powder, rather than the several flat forms. An endeavor will be made to find a satisfactory ammunition bag, possibly of smokeless powder cloth, and twice as long as the present bag. If the smokeless powder can be successfully made in strips 40 inches long, the larger size bag will be adopted for use in the navy. The advantage of this will be that only two bags will be required for the charge for the 12-inch gun, instead of the present four, and thus the operation of loading will be shortened, and the rate of fire of the piece correspondingly increased.

The Determination of Carbon.

With Special Reference to the Stability of Carbon Compounds in Steel.

BY JAMES A. AUPPERLE, INDIANAPOLIS, IND.

Baker* stated that in the determination of carbon, when the moist carbonaceous residue is dried at 100 degrees C, there is a loss of carbon due to the formation of carbon dioxide. As it requires from one and a half to two hours to dry the residue at 90 degrees C., it will mean that much time can be saved when it is shown that it can be dried in about 20 minutes without loss. In presenting this article, the writer has gone to extremes in introducing unfavorable conditions in order to prove beyond a doubt that the carbonaceous residue can be dried without loss at temperatures above 100 degrees C. The steels experimented with were made by the open hearth, Bessemer and crucible process, containing the carbon, as shown by microscopical examination, in the form of pearlite, sorbite, martensite and cementite.

Drying the Residue of Hypo-Aeolic Steel.—It was

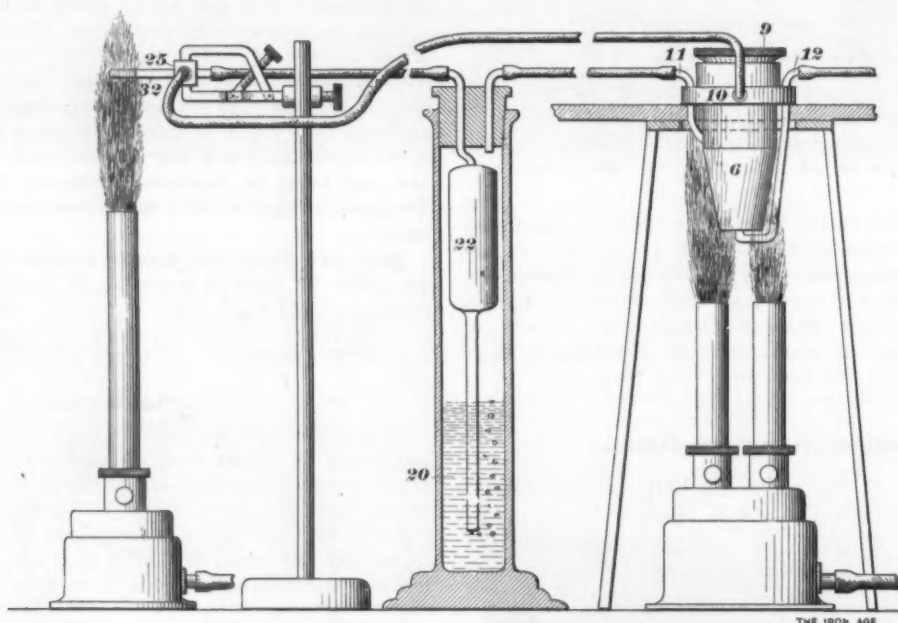
Standard containing 1.06 per cent. carbon was heated at 125 degrees for 15 hours it suffered a loss of 0.06 per cent. Other samples containing about 1 per cent. carbon showed about the same rate of loss. Assuming that the oxidation is at a uniform rate, this would be at the rate of 0.002 per cent. in 30 minutes, drying.

Cementite the Most Unstable Constituent.—When drying the residue at high temperatures, those steels containing cementite showed the most loss, especially if they contained chromium. A steel containing 0.60 per cent. chromium and containing 1.01 per cent. carbon showed no loss when dried for 30 minutes at 125 degrees C. When dried for 30 minutes at 200 degrees C. it yielded 0.73 per cent., or a loss of 0.28 per cent.

Cementite, pearlite and sorbite can be burned at a dull red heat, while martensite requires a higher temperature for complete combustion.

Tungsten steel can be dried without loss at 125 degrees C. High speed tool steel containing chromium, tungsten and molybdenum is analyzed for carbon by the chromic acid method.

Effect of Nitrates and Nitric Acid.—Should the copper salt be contaminated with nitrates, it should cause no



Special Form of Apparatus Used.

THE DETERMINATION OF CARBON.

found that open hearth steel containing 0.09 per cent. carbon could be dried for 30 minutes at 200 degrees C. and suffer no loss of carbon. Above 0.09 carbon to 0.80 carbon, same existing as pearlite or sorbite, there was a maximum loss of 0.053 per cent. in crucible steel containing 0.817 per cent. carbon when the residue was dried for 30 minutes at 200 degrees C. The same steel when dried for 5 to 10 minutes at 200 degrees C. showed no appreciable loss. Under these conditions (drying in 5 to 10 minutes) the samples are completely dried, and the residue attains this temperature for a very short time, owing to the rapid evaporation of the moisture. It must not be understood that the writer is advocating drying at 200 degrees C., but it was necessary to carry this temperature in order to incur loss, and to study the effect of time and temperature upon the various carbon constituents.

In steel containing up to 1.30 per cent. carbon there is no loss when the residue is dried for 15 minutes at 150 degrees C. Steel containing 1.47 per cent. carbon yielded 1.41 per cent. when dried for 15 minutes at 150 degrees C., thus showing a loss of 0.06 per cent. Of all samples of steel examined there is no loss when the residue is dried for 30 minutes at 125 degrees C., samples being completely dry in 20 minutes. In noting the effect of time, it was found that when the International Steel

concern, as the writer found they do not vitiate the result.

To 60 c. cm. of cuprammonium chloride there was added a filtered solution containing 20 grams of ammonium nitrate. The steel was dissolved in this solution, the residue was dried at 125 degrees C. for 30 minutes; none of the steel examined showed any loss of carbon.

There are few things of more importance than tight joints in the apparatus, and if the results are low, and come from loose joints, the difficulty is easily located by using a 500 c. cm. flask half filled with water, and closed with a two-hole rubber stopper carrying an L tube, connected by a rubber tube with the apparatus, and one straight 30-inch glass tube reaching almost to the bottom of the flask. As the pressure increases the water rises in the perpendicular tube. When about a 20-inch column of water can be maintained for five minutes the apparatus is considered tight, and the tester is removed.

Nitrates having been found to have no effect upon the accuracy of a carbon determination, it was desired to note the effect of adding 5 per cent. by volume of nitric acid to the solution of the copper salt, as this may be done inadvertently.

In addition to the 5 per cent. of hydrochloric acid contained in the solution of cuprammonium chloride, a further addition of 5 per cent. by volume of nitric acid, equivalent to 15 per cent. by weight of the copper salt, was added thereto.

* Baker (J. C. S., II, 253). Carbon containing moisture gives rise to CO₂ when heated at 100 degrees C.

Of the several samples of steel examined, whether containing chromium, or tungsten, or whether they were straight carbon steel, not one showed any loss when carbonaceous residue was dried for 30 minutes at 125 degrees C. Hence 5 per cent. nitric acid is without effect on accuracy of carbon results.

The following table shows the results when the carbonaceous residue is dried at temperatures above 100 degrees C.:

Carbon as—	Per cent. carbon dried 2 hours at 90° C.	Per cent. carbon dried ½ hour at 125° C.	Per cent. carbon dried ¼ hour at 150° C.	Per cent. carbon dried 10 minutes at 200° C.	Per cent. carbon dried ½ hour at 200° C.
Pearlite	0.090	0.097	0.095	0.095	0.092
Pearlite	0.240	0.240	0.242	0.239	0.209
Pearlite	0.440	0.430	0.428	0.420	0.399
Pearlite	0.700	0.686	0.692	0.680	0.662
Sorbite	0.720	0.704	0.711	0.717	0.694
Sorbite	0.690	0.691	0.700	0.700	0.659
Sorbite	0.817	0.812	0.803	0.800	0.764
Sorbite and cementite	0.934	0.942	0.937	0.900	0.897
Sorbite and cementite	1.013	1.014	0.980	0.890	0.730
Sorbite and cementite	1.077	1.069	1.070	0.971	0.850
Martensite, cementite	1.040	1.039	1.050	0.960	0.890
Martensite, cementite	1.100	1.110	1.100	1.012	0.930
Sorbite, cementite...	1.024	1.019	1.030	0.850	0.790
Martensite, cementite	1.470	1.465	1.410	1.210	1.000
Sorbite, cementite...	1.280	1.299	1.270	1.030	0.980
Sorbite, cementite...	1.220	1.190	1.220	1.090	1.030
Sorbite, cementite...	1.470	1.480	1.410	1.120	1.060

Description of Apparatus.—The apparatus used in these experiments was designed by the writer and is shown in accompanying engraving. It consists of a platinum crucible, 6, closed by a nickel stopper, 9, carrying a ground joint without washers of any kind. An annular water jacket, 10, surrounds the crucible, through which pass both inlet and exit tubes, 11 and 12. The exit tube 12 is connected directly with a 10-bulb Meyer tube containing 100 c. cm. of a 2½ per cent. solution of barium hydrate. This exit tube has a bundle of fine platinum wire within it, just below the bottom of the crucible. This wire answers two purposes: First, to absorb the heat from the bottom of crucible until tube 12 is hot enough to oxidize all carbon monoxide to dioxide, and, second, to assist in oxidation of carbon monoxide.

This apparatus requires no copper oxide, and will do good work without the bundle of platinum wire, but the speed is limited without wire. The inlet tube 11 is connected with a straight tube containing stick caustic potash. This in turn is connected to washing bottle, 20, containing caustic potash. The pipette, 22, prevents any recession of potash into U-tube, 32, should there be any back pressure. The platinum U-tube, 32, surrounded by a water jacket, 25, is heated to redness at the bend, and performs the function of oxidizing to carbon dioxide all carbon compounds likely to contaminate the air or oxygen used for combustion. Some chemists use a cumbersome preheating furnace for this purpose. They will appreciate the advantage of so small and efficient a substitute, termed by the writer a "preheater." The water jacket of the preheater can be connected with the water jacket of the crucible, and one connection serves to connect it with the water service, and another to the drain into the sink.

Walters* showed that no copper oxide is necessary when a platinum tube is used. He made a combustion in 10 minutes, and suggested that it might be possible to make one in less time.

Description of Method.—One gram of high carbon steel is dissolved in 60 c. cm. cuprammonie chloride contained in a 4-ounce, wide mouth, glass stoppered bottle. Violent agitation usually causes the steel to go into solution in five minutes. After solution the bottle can be placed in a centrifuge and whirled for a minute. The residue settles in a compact mass, and the solution filters very rapidly. A Gooch crucible is used for filtering.

After washing the residue with dilute hydrochloric acid and water, the crucible is heated to 125 degrees for 15 to 30 minutes. It is then placed in the special combustion crucible. The preheater being hot, the crucible is heated to redness, oxygen or air being forced through

the apparatus in the meantime at the rate of 100 to 150 c. cm. per minute, and same continued for five minutes.

The barium carbonate formed is filtered on a 7 cm. paper, washed with boiled distilled water, burned and weighed. It was found that the oxygen or air could be forced through the apparatus at the maximum rate of 250 c. cm. per minute, and three minutes is sufficient to sweep all carbon dioxide into the absorption bulb, and no carbon escaped complete oxidation or passed through 100 c. cm. of barium hydrate. If less than 100 c. cm. is used, or there is much less than 25 grams barium hydrate to the liter, then there is loss from some carbon dioxide passing through unabsorbed when using 250 c. cm. air per minute. It is also shown that the least amount of air that would oxidize a 1 per cent. carbon and completely sweep it into the barium hydrate was 400 c. cm.; 100 to 150 c. cm. of air per minute for five minutes has been found to give good results.

Permeability of Platinum to CO₂.—In making a comparison between this special crucible and a porcelain tube, it was found that when the air in both cases is under excess pressure the amount of blank obtained was exactly the same, under the same conditions. Much has been written about platinum being permeable to CO₂, but the writer does not concur with other chemists on this point, unless the platinum is crystallized or has a crack in it.

Tracing the Blank.—It was found that the porcelain tube gave a blank, and the writer, being anxious to know from whence it came, collected the oxygen after it had once passed through the red hot tube loaded with copper oxide. Under these conditions there could not be anything combustible in the collected oxygen. But in re-passing this purified oxygen through the apparatus again the same blank was obtained as before. This proved but one thing—namely, that the oxidation of the rubber connections gave the blank.

Table Showing Time and Amount of Air Necessary for Combustion.

Carbon. Per cent.	C. cm. air.	C. cm. air per minute.	Time. Minutes.	Carbon Per ct.	Remarks.
0.934	380	76	5	0.947	
0.934	300	60	5	0.926	
1.22	350	117	3	1.229	
1.22	250	83	3	1.010	Not enough air.
1.22	500	250	2	1.080	Time too short.
0.99	400	80	5	0.979	
0.99	500	170	3	0.997	
0.99	600	60	10	0.979	
0.99	1,000	66	15	0.984	
0.99	650	325	2	0.890	Too fast, time short.
0.99	400	100	4	0.984	
0.99	300	60	5	0.840	Not enough air.
0.99	1,000	250	4	0.988	
0.99	600	57	7	1.005	
1.05	1,500	250	6	1.059	

Concluding Remarks.—Barium hydrate† gives a more granular precipitate when used hot. This is best done by using a 4-liter flask and keeping a ¼-inch argand flame beneath it. A siphon having a rubber tube controlled by a pinch cock is very convenient. The entering air is purified by passing through a tube containing stick potash. Barium carbonate is most easily washed by keeping the boiled distilled water in a reservoir about 3 feet above the table, two tubes depending therefrom, one without a nozzle to quickly run water into the tube, and the other with a fine nozzle to stir up and wash the barium carbonate. A wooden support containing two perpendicular pieces of wood, each suitably notched, is very convenient to hold the Meyer bulb. It can then be quickly removed and set aside to make place for the succeeding bulb.

When the carbonaceous residue is ignited wet a combustion can be finished in 20 minutes from the time sample is received.

It occurs that joints are not well ground on some dissolving bottles. These can be ground by moistening the stopper, adding a small amount of flour emery and revolving stopper in mouth of bottle.

* Deville and Troost (C. N., vii, 294), (and others). Platinum tubes are porous to gases and vapors at high temperatures.

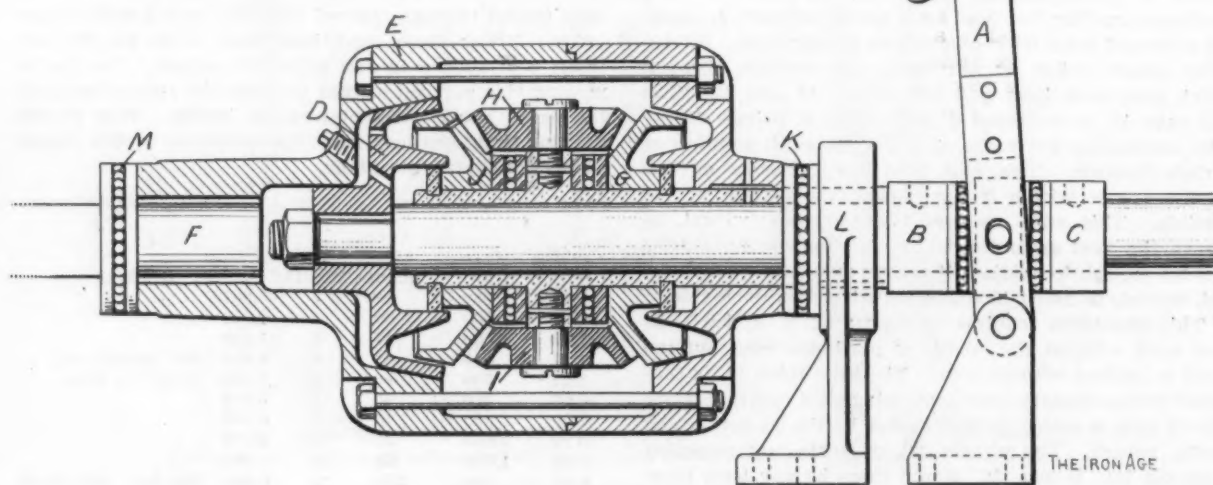
† Communicated to the writer by H. E. Walters, Pittsburgh, Pa.

* Walters (E. S. of W. Pa., December, 1902). Note on the estimation of carbon by combustion in iron and steel.

The Mietz & Weiss Reversing Clutch.

In *The Iron Age* of January 28 last there was described a two-cylinder Mietz & Weiss marine kerosene engine, as manufactured by August Mietz, 128 Mott street, New York City. This engine was fitted with a reversing clutch for forward and astern driving of the propeller, in which some modifications have since been made to the betterment of its construction. These changes may be discerned by comparing Fig. 3 of the former article with the accompanying illustration. The principle of operation is the same as before, the change in direction of motion being obtained by throwing the controlling handle forward or backward or from left to right, as it is seen in the illustration.

This lever marked A in the drawing herewith is bifurcated at its lower end, pivotally mounted below the shaft and engages lugs on a phosphor bronze collar on the shaft. Adjoining this collar and keyed to the shaft are two other collars, B and C, with ball bearings between them and the nonrotating collar which connects with the lever. Shifting the lever to the left causes the shaft to force the clutch disk D into contact with a friction surface on the interior of the drum E. This drum is rigidly secured to the end of the engine shaft F, and with the mechanism in the position which has just been indicated both shafts are caused to run in the same direction. With the lever in its central position all clutch surfaces are disengaged, allowing the engine to run idle.



Cross Section of the Mietz & Weiss Reversing Clutch.

while the outer shaft remains stationary. Throwing the lever to the right engages the friction disk G with a friction surface on the interior of the drum at the opposite end from the first mentioned surface, so that it rotates in the same direction as the engine. G is not fixed to the shaft, but revolves on a sleeve, which is restrained from rotating with the shaft by a feather in the bearing L. The friction G is also a bevel gear, and engages with intermediate gears H and I, giving the gear J rotation in the opposite direction. A friction surface on the inside of D is engaged with a friction on the bevel gear J, which transmits the reverse motion to the outer shaft.

A ball thrust bearing, K, between the drum E and the standard L takes the thrust of the casing when the mechanism is operated in its reverse direction—that is, with the lever to the right. Similarly a ball thrust bearing, M, at the opposite end of the drum casing takes the thrust attending the operation of the mechanism with the lever at its left hand position. Ball bearings are also provided for the idler gears H and I to reduce the friction when they are in action. The casing is made in two parts, which are held together by long bolts, allowing the gears to be exposed for inspecting or repairing. These reversing clutches are furnished complete as shown, but without the lever and bracket, which may be arranged to suit any special conditions, as the device is obviously adapted for many other purposes besides the reversing of propeller shafts.

New Publications.

Facts About Peat—Peat Fuel and Peat Coke: How to Make It and How to Use It; What It Costs and What It is Worth. By T. H. Leavitt. Publishers, Lee & Shepard, 202 Devonshire street, Boston, Mass. Pages 115. Price, \$1.

The author of this interesting work has for many years been making a practical and intelligent study of peat as a fuel, until he has come to have a widely extended reputation as an authority on a subject which has of late been given much serious attention. Years ago, when he was operating a plant for the manufacture of peat fuel at Lexington, Mass., he published a treatise bearing the same name as the volume now fresh from the presses of his publisher. The renewed interest that

has been given the subject since the coal famine resulted in so great a demand for the older book, long out of print, that the author was led to prepare a substitute volume which brings the subject up to date and contains much information that will be of value to those who have taken up the question of peat for serious consideration, and especially to those who contemplate investing money in the business. Classing the methods of preparing peat for fuel under two general classes, pressing and condensing, Mr. Leavitt expresses himself strongly in favor of the latter process, which is the method embodied in a machine of his own design. This machine was originally put into operation more than 30 years ago and has been recently perfected, its several stages of development being shown in the volume. The secret of preparing the fuel is the expelling of the water contained, which is a very large percentage of its weight, and rendering it non-absorbent after it has been converted into a mineral like substance. Mr. Leavitt maintains that extreme pressure cannot accomplish the desired end, as proved by repeated attempts, and that when pressure is employed after evaporation—that is, after the peat has been made dry—"the plastic and adhesive properties of the material, necessary to produce a compact and enduring mass, are not only not developed, but are actually destroyed, and the particles composing the block of fuel are held together only by force of compact or pressure, the effect of which yields alike to fire and water. Fire disin-

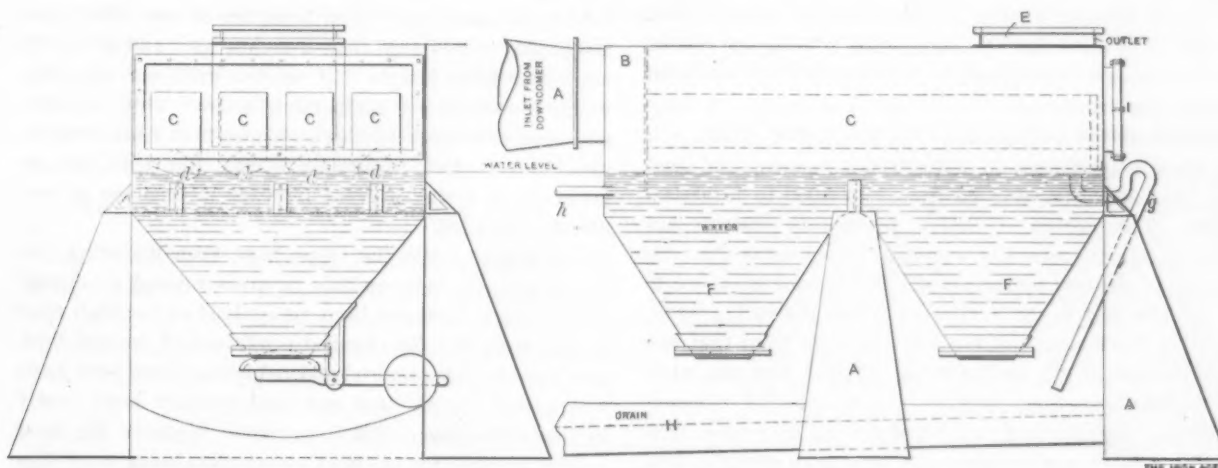
tegrates it and water dissolves it. Handling and transportation tend to crumble it." The condensing process, which Mr. Leavitt believes in as the real solution of the problem, consists of grinding and mincing the wet peat until it is of the consistency of mortar and then forming it into briquettes which are dried, no pressure being employed.

Apart from the discussion of the best methods of procuring the crude peat and of the preparation of the fuel and its coke, the author gives much interesting information on the general subject, including tests of the fuel for steam purposes, both in stationary boilers and in locomotives; the value of the fuel for metallurgical purposes, for which it has been employed for a great many years; its value as a domestic fuel; its antiseptic value; its cost and its by-products. Running through the various chapters is a gleaming of the history of the curious fuel that exists in countless miles of boglands all over the temperate zones. Very striking in the story of peat is the long series of failures that had followed attempts to develop it as a cheap and efficient fuel. Mr. Leavitt believes that by the process of condensation the whole problem will be solved and that peat, existing everywhere out-

The Riddell Gas Washer.

The characteristic feature of the new blast furnace gas washer, illustrated herewith, is that it treats the gas in a thin sheet, insuring the washing of every particle of gas. It is the invention of Joseph Riddell and his son, W. A. Riddell, of Wheatland, Pa., and has been patented in their names.

The washer is built of heavy plate throughout, and is rectangular in plan, with two conical bottom portions, F, in which the ore dust is precipitated to the bottom over the traps. The gas is first admitted into an equalizing chamber, B, from the downcomer pipe A, which conveys the waste gases from the furnace to the stoves and boilers. This chamber is formed by a plate extending from the top of the tank down into the water, and completely across the tank, as shown. Its duty is to take up the force of any "kicks," or explosions, which may occur in the furnace, and to prevent large pieces of coke which may be blown over from getting into the four long pipes C, doing so by allowing them to pass through the opening shown down into the water over the trap. After leaving the equalizing chamber the gas



End and Side Elevations of the Riddell Gas Washer.

side of the tropic zone, will be a very important factor in the fuel question of the near future. He gives credit to several more or less successful efforts now making to place peat upon the market.

The Far Eastern Review, a monthly review of the Far Eastern trade, finance and engineering, dedicated to the industrial development of trade in the Philippines and Far Eastern countries, is a new periodical published in Manila, P. I., by George Bronson Rea, an engineer and newspaper man formerly of New York. The first issue made its appearance in June, and had a number of exceedingly interesting articles. Notable among them were the following: "Approved Water System for Manila," by J. F. Case, engineer in charge; "Modern Rice Culture," by Wilbur J. Béaudeau, rice culturist, Bureau of Agriculture, Philippine Islands, and "Iron Region of Angat, Province of Bulacan, Luzon," by H. D. McCaskey, chief of Mining Bureau. The regular departments under which items of Far Eastern news interest will be collected are railroads, building news, mining review, construction and engineering news, financial review, industrial notes and markets. These items will be largely obtained from the daily and weekly press of the East. The publisher announces it as his purpose "to assemble together the vast amount of industrial and trade information of the East, so as to show the business opportunities in various lines, making the review of general interest and value, not only in the commercial centers of the East, but to the capitalists and manufacturers of the United States and Europe." The field is a new one and is large and important. It has never been covered before and there is every reason to anticipate success for the new publication.

passes into the long pipes C, each of which has two slots, *d d*, on its lower side. It issues from these slots in thin sheets the entire length of the pipes and is impinged on the water in that shape. It then passes up around the pipes into the top of the tank and through the outlet marked E, thence to the stoves and boilers. The precipitated dust descends over the traps and is discharged into the drain H below at the will of the operator by opening the weighted gates. The curved pipe *g* is an overflow to waste the surplus water into the drain. The water inlet pipe *h* is at the opposite end of the tank, just under the gas inlet. A cleaning door, I, provided at one end, allows the pipes to be removed if necessary.

This process is calculated to remove 85 per cent. of the dust in furnace gas. Besides being simple, compact and efficient, it can be constructed at little expense. Several prominent concerns operating blast furnaces have shown an interest in the washer, and one is soon to be placed in one of the Shenango Valley furnaces.

"Nomex" is the name of a device recently brought out in England for rendering all receptacles containing inflammable liquids secure from explosion. It is a modification of the Davy lamp, with the addition of a fusible cap. The orifice to the tank is made the outlet for a perforated tube which descends to the liquid. This allows any heated gas to escape and burn on the outside, but will not permit the flame to get into the interior. The cap for this orifice consists of a plug of fusible metal, which will melt at a relatively high temperature, and allow the gas found to escape, and burn quietly on the outside, thus preventing all possibility of a disruptive explosion.

The Iron Age

New York, Thursday, October 6, 1904.

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GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.

The Business Outlook.

So far as the crops can make it, this is not to be a year of calamity. The season is so well advanced that, with the exception of cotton, the agricultural outcome can be referred to with certainty. Even in the case of cotton, no fears now exist of serious damage, as picking is in full swing from Virginia to Texas. No crop has proved a failure, although all have fallen somewhat under the high expectations of the early summer. At that time the prospects favored a yield of wheat at least equal to that of last year, and record breaking crops of corn and cotton. It now appears to be generally accepted that the combined winter and spring wheat crops will not amount to more than 525,000,000 bushels; that the production of corn will be from 2,000,000,000 to 2,250,000,000 bushels, and that the yield of cotton will be from 11,500,000 to 12,000,000 bales. The outturn of other agricultural products has been excellent, generally equaling, if not exceeding, the results of the best recent years. The nearest approach to a calamity was in the Northwest, where the spring wheat suffered from rust; but the latest reports from that section are not nearly so disturbing as those sent out when the blight was first observed and speculators exaggerated its extent for the purpose of forcing up prices. The entire country was exceptionally free from drought, and, although rain was abundant, yet it was excessive in only a comparatively limited section. In fact, the year may be regarded as a generally favorable one for agriculturists. Not only have they been blessed with fair crops, but they are getting remunerative prices for them. As the prosperity of this country depends so largely upon the prosperity of the farmer and planter, the foundations have thus been laid for another period of good business.

In all business calculations the crops of the three great staples, wheat, corn and cotton, receive most consideration. They are of the highest importance, not only because of their direct value to home interests, but also for their bearing upon international trade. It may be assumed that a short crop of any staple, sold at a high price, is just as good for the producer as a large crop sold at a low price. But the larger crop furnishes much more traffic to railroads, and what is of more importance, it enables the consumer to supply his wants more cheaply. Dear necessities of life bear hard upon the workingman, who demands higher wages to enable him to support himself and his family, and the cost of production of manufactured products is enhanced. A diminished surplus in any staple over the actual necessities of the country also adversely affects our international trade. It would be highly advantageous for us if at this time, when the world's wheat crop has suffered a heavy shortage, we were in possession of a good surplus for export, and could thus increase our trade balance abroad. But we will probably have little or no wheat to spare, and may, indeed, consider ourselves fortunate if we are not obliged to import some before the next crop is threshed. As to corn and cotton, we are much more favorably situated. We will have a surplus of both. The quantity of corn exported may not be very large, but the surplus crop will

supply bountiful food for hogs and cattle, and thus it will go abroad in the form of meat and provisions.

When the year opened the prediction was freely made by business interests that, unless serious disaster occurred to the crops, a great stride would be made toward recovery from the depression which set in during the summer of 1903. A widespread crop failure, with the usual hesitation of a Presidential election year, would have been a very severe strain, following the impairment of confidence by the heavy decline in securities. But the time has passed for such a disaster, and the future is regarded with confidence, based largely upon the sound condition of the farming community. That this view is taken by capitalists is demonstrated by the strength of securities. Prices of railroad and industrial stocks are advancing, and timidity is rapidly giving way to courage. Little apprehension appears to be felt with regard to the Presidential election, and, unless some untoward influence should project itself, the spirit of confidence which has been awakened will lead to the resumption of enterprises held in abeyance, and the undertaking of new ones. Less machinery is idle now than a month ago, and gradually more and more wheels will revolve until our manufacturing industries are again fairly active. This, however, may require several months, as winter is at hand, with its usual interruption to outdoor work. But with the appearance of spring a great increase in business is confidently expected.

Meantime, while the crops have been maturing, the iron trade has been making progress toward a sounder basis. Prices have not been maintained at the high level of last year, but the changed conditions of general business have been recognized and reductions have been made which have brought iron and steel products more nearly in line with them. Pig iron, which is under the least control of any iron or steel commodity, being most free to be influenced by variations in the demand, has gone through a period of ebbing consumption and declining prices, and is now on the mend, with a steady increase in sales. Finished iron and steel products, on which reductions in prices have been made, may not immediately respond to the inducements thus offered to buyers: but favorable indications of better trade are seen in the reported improvement in specifications on contracts, some of which date back to the early months of the year. Steel rails alone have successfully resisted the general impulse toward a lower level of values, but the reason for this is plain. Railroad companies have been forced to economize this year and lower prices on rails would not have brought much additional business to the mills, whereas, any reduction made would have correspondingly cut down the figures named in contracts, thus lessening profits without any compensating advantage. It is only reasonable to expect that the close of the year will find rails in line with other steel products. The improvement in earnings now being reported by railroad companies foreshadows a revival in their purchases of equipment and track requirements. As the slackened demand from the railroads was the main cause of the depression in the iron trade, a correspondingly important stimulus will be imparted to the trade when they again become free buyers.

From numerous sections of the country come reports of the projected building of connecting links in trolley systems. Apart from the greatly increased facility of travel which the completion of unbroken long distance electric lines will bring with it, the carrying out of these plans will mean a very substantial demand for the various materials and equipments which enter into electric

traction. The trolley field has been pretty well preempted by the energetic promoters of the earlier days of the electric railway, so that, taken as a whole, the new mileage of 1905 may not be so large as in previous years. But the new work will be of a higher average class of construction and equipment than has heretofore been the rule, and probably the money expended on electric railway extension, rebuilding and equipment will be fully as great next year as in any previous year. This may be putting it a little too strongly, for certain individual years have seen the mark in dollars go abnormally high. But, unless the signs fail, it will be satisfactory to the manufacturers of electric railway material of all descriptions. Like 1904, next year will see many millions of dollars spent in providing for the most economical operation of electric railways by the substituting of better roadbed, better overhead equipment, better and higher powered rolling stock, and increased power in central stations, in place of what was considered first-class material and equipment a few years ago. Like everything else in the world of commercial electricity, the charge-off for depreciation is a very material percentage, or, at any rate, it should be, because of the rapid strides that are being made in everything that goes with electric railways. And a great deal of such money will be spent next season.

Coast Fishermen Using Power Craft.

The combustion engine has wrought a great change in the condition of the American coast fisheries during the past two or three years, to the profit of the enterprising fisherman and to the equal advantage of the consumer in the large cities. By means of motor driven boats the fisherman is able to quickly take his catch to market or to a point at which steamboat or railroad will take it the remainder of the distance, so that his fish are fresh when displayed to the consumer in the city markets and the price received and the amount of fish sold are naturally greater than under the old conditions, when wind and weather governed delivery.

It is interesting to look over the craft in any one of the hundreds of places along the coast where fishing is an industry and note the adaptation of the combustion engine, generally of the gasoline type, but sometimes using petroleum. Fine new launches with deck cabins are in sharp contrast to the open dory, seaworthy and rather fast, or to the well rounded catboat, denuded of mast and sail, that the gasoline or kerosene may be more sure to accomplish the certain arrival at fishing ground or market. Just as the old-fashioned farmer has adopted the little engine to do his work, so has the old-time fisherman taken advantage of the progress of the motor and makes money out of it. In Narragansett Bay, for example, a typical fishing ground, with New York City as the principal market, the fishermen get to-day's catch into New York to-morrow morning by running to Newport in power boats and leaving it for the New York boats. One little group of such fishermen cleaned up \$5000 above a season's living expenses for themselves and families because they had a 50-foot naphtha launch to make the daily run of a dozen miles to Newport. Under old conditions of delivery by catboat or sloop, the profits were but a small part of the present earnings.

In this connection it is well to consider the possibilities of the application of the combustion motor to the deep sea fishing fleet. Auxiliary fishing vessels are already in use with engines intended for operation only when the wind fails. But the day is coming, many believe, when the sail will be the auxiliary and the motor

the main source of motive power for this class of vessels. The present objection is the element of uncertainty that exists with the motor boat, especially in the sparking arrangement, which has a tendency to get out of adjustment unless handled skillfully. The strain is great, as it is in the automobile, and it makes more difference when the breakdown occurs on the water than it does on land. On the other hand, the development of the combustion motor has been exceedingly rapid, and probably the motor of 1904 has developed very few weaknesses compared with those produced in previous years. Each succeeding year will bring more perfect results, naturally, until the combustion engine will be as perfectly reliable as the engine of steam. If serious attempt is made to earn the \$2000 prize offered by M. Charley, the French enthusiast, for the first motor boat to cross the Atlantic on its own keel and under its own power, an opportunity will be given to study the question of deep sea navigation for this class of boats. The principal objection appears to be the fuel carrying capacity of the boats. Yet in commercial use, with much heavier vessels than those used for trials of speed, the fuel question may be as satisfactorily solved as in steamships burning oil for fuel.

Self Contained Electric Passenger Cars.

Highly successful experiments with self contained electric passenger cars on the lines of the Northeastern Railway of England are receiving a great deal of attention from electrical engineers and others interested in electric traction and in the great general problem of the handling of suburban traffic in crowded communities. It seems quite possible that the next epoch of suburban traction will be independent of electric wires, electrified rails and central power stations. The advantages of such a system are important. There is danger in the third rail for surface traction. The overhead trolley is, perhaps, even more dangerous, especially in crowded streets of cities. All existing forms of electric traction are seriously affected by winter conditions in northern climates because of the existence of snow, and especially of ice. The central power station is a case of all the eggs in one basket, for an accident to the machinery will tie up an entire system or a considerable part of a system, which is no uncommon occurrence. Probably the third rail will continue to be the most efficient form of operating elevated lines, the underground trolley for surface lines in large cities, and the overhead trolley for minor suburban systems and in smaller cities. But for suburban traffic in large communities and for interurban traffic between important centers no entirely satisfactory system has yet been devised, which is the reason for the unusual interest attaching to a system in which the car is an entire unit in itself. The important data as to the relative cost of such an equipment as compared to the third rail and the trolley are not yet available, but an offhand estimate does not seem to place the cost as prohibitive. Probably the initial cost for the cars would be much higher than under present systems, but, on the other hand, the great cost of central power station, substations for rotary converters, feed wires, trolley wires, third rail, &c., would all be eliminated. As to maintenance, the cost of actually running the car is not known, but certainly the cost for general maintenance and repair should be less under the individual unit system.

The Northeastern Railway is operating two cars in public service, after a long series of tests that demonstrated the practical working of the system. Each car contains a four-cylinder petrol engine of 90 horse-power, with four cylinders of 8½-inch bore and 10-inch stroke.

The engine operates a generator, which sends its current to the motors. It is a complete electric plant on a small scale. The experiments with the cars were studied for a considerable period by experts of the General Electric Company, and the result was the placing of an order for one of the same type of engines from the manufacturer, the Wolseley Tool & Motor Car Company, Limited, Birmingham, England. The engine will be more powerful than those in use on the Northeastern Railway, having six cylinders of 9-inch bore and 10-inch stroke, developing 140 horse-power, which is about the usual power transmitted by the motors of one of the large electric surface cars in common suburban use. In England this order is said to be the preliminary of a much larger contract from the American company. Doubtless the engineers of the General Electric Company will develop the idea embodied in the English system and apply it to American conditions, and the results will be watched with much more than ordinary interest.

Another system for accomplishing the same general result has been adopted by one of the other large railroads of Great Britain, by equipping individual cars with a complete steam propelling apparatus, so that the unit idea exists, but without the intermediary of electricity between the engine and the driving wheels. Most experts do not look with favor upon this plan. They prefer the greater mobility of the electrically operated coach.

The feeling of unrest and uncertainty that prevails among railroad men concerning the question of handling suburban traffic holds out high hopes to the individual or concern that can find the solution of the problem in some form of electric locomotion that will combine speed, safety and reliability at a moderate cost, so that the competition of the ordinary surface cars may be met and at a profit to the railroad.

The Pittsburgh Foundrymen's Association.

The regular monthly meeting of the Pittsburgh Foundrymen's Association was held in Engineers' Hall, 410 Penn avenue, Pittsburgh, on the evening of October 3. This was also the annual meeting. The following officers were elected: W. H. McFadden of Mackintosh, Hemphill & Co., president; B. D. Fuller of Westinghouse Electric & Mfg. Company, vice-president; J. S. Seaman of Seaman-Sleeth Company, treasurer, and F. H. Zimmers of Union Foundry & Machine Company, secretary. An Executive Committee was also elected, consisting of William Yagle, Yagle Foundry & Machine Company; A. W. Slocum, National Car Wheel Company; G. C. Shade, Braddock Machine & Mfg. Company, and J. S. McCormick, J. S. McCormick Company.

The annual report of the secretary was read, showing that the association had 46 members on October 1 last year and that during the year three resigned and 16 were admitted. At this meeting Bryan, Robertson & Co. and F. N. Armour were admitted as members, giving the association a total membership of 61 at present. A full discussion was had as to the best means of promoting interest in the association, although the reports of operations last year were very satisfactory. After adjournment a luncheon was served, and this is expected to be a feature of each meeting in the future.

Governors of Illinois, Missouri, Iowa, Wisconsin and Minnesota will be guests of the Upper Mississippi Improvement Association at its annual convention, to be held at Dubuque, Iowa, November 15 and 16. The purpose of the association is to effect the construction of a permanent channel carrying 6 feet of water at the lowest summer level, between St. Paul and St. Louis. The National Government will be asked to appropriate \$15,000,000 for this purpose.

PERSONAL.

Charles A. Parker, formerly traffic manager of the Colorado Fuel & Iron Company, Denver, Col., has resigned that position to become traffic manager of the Cincinnati, Hamilton & Dayton-Père Marquette system. Following Mr. Parker's resignation the traffic manager's office of the Colorado Fuel & Iron Company has been consolidated with that of vice-president and manager of sales and will be included under the direction of J. F. Welborn, vice-president.

R. L. Drake, C. W. Wilson, H. G. Halleck, E. C. Shoecraft, John O. Taylor and E. C. Banta, six Chicago engineers, left last week for the Isthmus of Panama, where they will assist in the mechanical work of the canal construction.

George Warrington, founder of the Warrington Iron Works, Chicago, has become superintendent of construction in the United States Light House Service at Washington. His appointment made it necessary to incorporate his business, which will be operated in his name during his absence.

J. R. Wemlinger, formerly engineer with the Cambria Steel Company, Johnstown, Pa., has been appointed assistant to the New York sales agent of the Gautier department of the same company, at 71 Broadway.

Daniel A. Snyder, superintendent of the mills of Moorhead Brother & Co., Incorporated, at Pittsburgh, has resigned to accept the position of master mechanic with the Rome Brass & Copper Company, Rome, N. Y.

At the annual meeting of the Crucible Steel Company of America, to be held in Jersey City this month, it is expected that J. Denniston Lyon, a banker of Pittsburgh, will be elected a director, to represent the minority stockholders, and also to take the place of W. P. Snyder, who has declined re-election.

Herman Nieter, who has had 16 years' experience in the iron business with the Bethlehem Steel Company and others, having been last in the employ of the Engineering Company of America, has been appointed sales agent for the Hammond Iron Works, Warren, Pa., with an office at 180 Broadway, New York.

J. W. Copeland, who has been in the railroad supply business for many years, with recent headquarters in Denver, representing the American Steel Foundries, Spang, Chalfant & Co., Incorporated, Braeburn Steel Company and others, has been appointed Western manager for the Braeburn Steel Company, with headquarters in Chicago, effective November 1.

The Cincinnati Molders' Strike.

CINCINNATI, OHIO, October 3, 1904.—Injunctions have been issued by the Federal Court in Kentucky to the Newport Iron & Brass Works, and by the Superior Court of Cincinnati to the Buckeye Foundry Company, the Chris. Erhardt Foundry Company and the I. & E. Greenwald Company, against the Iron Molders' Union of North America. A full recital of the grievances appears in the legal documents, which are of the strongest character possible, and absolutely prohibit any hindering or obstructing the work in the several foundries mentioned. Matters had been comparatively quiet until Saturday evening, when there was a slight disturbance at the Eureka plant. This was promptly quieted, resulting in the arrest of several union molders for contempt of court. Superintendent Waltz of the Employers' Association reports that the Eureka and Greenwald foundries are running with practically all the men they need, and that they expect to start the Victor, Knecht, the Erhardt and Buckeye plants this week.

The Federation of Engineering and Shipbuilding Trades of Great Britain has issued a pronouncement on the bonus system, which is declared to have "nothing to recommend it," and to be "an adaptation of the most pernicious and degrading condition of employment in modern industrial history—the task work system." The indorsement of the system by such an organization of British workmen would have been most surprising evidence of an industrial awakening in the United Kingdom.

National Metal Trades Association Notes.

CINCINNATI, OHIO, October 3, 1904.—Judging from advices being received, there will be a full attendance at the next meeting of the Administrative Council, to be held here on October 27, 28 and 29. This meeting will be immediately preceded by one of the Committee on Plans and Scope.

No changes worthy of note have occurred in the local labor situation at St. Louis during the week.

The regular monthly meeting of the New York Metal Trades Association will be held in the association's rooms on October 13 at 2 o'clock. Subjects of much importance will be discussed and acted upon at this meeting.

George M. Cooper has tendered his resignation as secretary of the Manufacturers' Association at Pittsburgh.

The strike at the shops of the Damascus Bronze Company, Pittsburgh, is practically off and the works are now running without any disturbance.

W. P. Eagan, commissioner, leaves the latter part of this week for an extended tour through the East, at which time he will attend the various meetings of the local trades associations in Massachusetts, Connecticut and New York.

The strike at the National Elevator Company's plant, Honesdale, Pa., is practically over and the shop is running at its normal capacity, without any disturbances.

From the reports being received from the various Chicago members, it would appear that their recent strike has had the effect of increasing both the output and its quality.

The next quarterly dinner of the Cincinnati Metal Trades Association will be given at the Business Men's Club, October 6, at 6.30 p.m. F. J. Miller, editor of the *American Machinist*, will speak on "Innovation"; F. B. Dyer, superintendent Cincinnati Public Schools, and John Shearer, superintendent Ohio Mechanics' Institute, will have for their subjects "Manual Training in Our Public Schools," and W. P. Eagan will give a talk on his association's work during the recent machinists' strike in Chicago.

The American Steel Foundries.

The annual meeting of the American Steel Foundries was held in Jersey City October 4. T. K. Niedringhaus of St. Louis, a director of the National Enameling & Stamping Company, was elected a director to succeed the late S. R. Callaway. The other retiring directors were all re-elected.

The income account for the fiscal year ended July 31 showed net earnings, after the expenditure of \$218,389 for renewals, repairs and maintenance, of \$585,218, a decrease from the net earnings of the previous year of \$1,175,720. After the addition of "other income" and the deduction of general expenses and fixed charges, the company had a surplus applicable to dividends of \$330,480. Dividends paid on the preferred stock during the year amounted to \$697,500, and in order to meet this outgo the company was forced to draw upon its previous surplus to the extent of \$434,185, reducing the profit and loss surplus to \$401,019.

In his annual report to the stockholders the president, Gen. Charles Miller, referred to the poor business of the past year as follows:

"This company has suffered by the reduced commercial activity of the past year in common with all other industrial enterprises; to what extent is best shown by the fact that the gross sales for the year ended July 31, 1904, are 46 per cent. less than the preceding year. The condition of the company's plants has been improved, and the monthly capacity materially increased, the directors believing that this work could now be done to advantage, so that the company may be prepared to turn out a large tonnage as soon as the industrial conditions have improved. Numerous economies have been effected in the expenses of general administration, amounting, all told, to upward of \$100,000 per year, without in any way impairing the efficiency of the organization.

"The company has recently acquired 30 acres of land on which there has been constructed and put into operation a new plant at Indiana Harbor, Ind., some 20 miles east of Chicago, adjacent to several of the trunk lines. The building of this plant was rendered necessary to meet the imperative need for greater output and by the impossibility of operating economically the plant in Chicago on account of track elevation of the Western Indiana Railway. The real estate in Chicago has been sold and the amount credited to the cost of the new plant at Indiana Harbor. This plant will have about twice the capacity of the former plant, and can be operated with greater economy.

"The company enters upon the new year with a materially increased business, and its plants equipped to meet the increasing demands. As will be observed from an examination of the balance sheet, the company has no floating debt. The use of cast steel in the construction of machinery, ships, war material, large buildings, railway locomotives and cars, both in new designs and as a substitute for forgings, iron castings and rolled steel, continues to increase. It is thus felt that the outlook, as to the future earnings of the company is encouraging."

The income account compares with that of the previous year as follows:

	1904.	1903.	Decrease.
Earnings	\$803,607	\$2,193,679	\$1,390,072
Renewals, &c.....	218,389	432,741	214,352
Balance.....	\$585,218	\$1,760,938	\$1,175,720
Other income.....	44,042	27,027	*17,015
Total income.....	\$629,260	\$1,787,965	\$1,158,705
Administration and other expenses	275,230	231,012	*44,218
Balance.....	\$354,030	\$1,556,953	\$1,202,923
Interest on bonds.....	23,500	23,500	.....
Balance.....	\$330,480	\$1,533,403	\$1,202,923
Dividends	697,500	698,200	700
Deficit.....	\$367,020	†\$835,263	*\$1,202,223
P. & L. adjusted.....	768,039	.....	*708,039
Total surplus.....	\$401,019	\$835,203	\$434,184

* Increase. † Surplus.

The general balance sheet, as of July 31, shows:

Assets.			
	1904.	1903.	Decrease.
Cost property.....	\$28,875,207	\$29,012,124	\$136,917
Additions	600,162	403,246	*196,916
Real estate.....	.....	310,366	310,366
Deferred charges to operation	81,879	39,586	*42,293
Investments	560,172	20,600	*539,572
Accounts receivable.....	784,043	1,859,803	1,075,760
Inventory, material, &c..	672,555	1,011,533	338,978
Cash	619,537	660,755	41,218
Totals.	\$32,193,555	\$33,318,013	\$1,124,458
Liabilities.			
Preferred stock outst'ding	\$15,500,000	\$15,500,000	.....
Common stock outst'ding.	15,500,000	15,500,000	.....
Underlying bonds.....	471,000	471,000	.....
Real estate bills payable.	.....	200,000	\$200,000
Accounts payable.....	204,776	634,715	429,939
Pay rolls and interest....	78,256	149,062	70,806
Contingent reserve.....	38,504	28,033	*10,471
Profit and loss surplus...	401,019	835,203	434,184
Totals.....	\$32,193,555	\$33,318,013	\$1,124,458

* Increase.

The asset item of investments increased from \$20,600 to \$560,172, caused by the organization of the American Steel Bolster Company and the Davis Locomotive Wheel Company, which are developing patents owned by the parent company, and the American Steel Foundry Company of Missouri, which owns a plant in that State.

The Cienfuegos, Palmira & Cruces Railroad & Electric Power Company is about to install a hydraulic plant at the Falls of Hababinalla, about 30 miles from Cienfuegos, Cuba. At first 4000 horse-power will be developed, though ultimate extensions to a total of 10,000 are intended. The first installment will consist of three 1000-kw. generators, direct connected to turbines under a head of 470 feet. The flume and penstock call for 9000 feet of 36-inch steel pipe. The power will be used for lighting Cienfuegos and its suburbs.

A French View of the English Iron Industry.—V.*

The Cleveland District.

The productive capacity of the works was far from being reached in 1903, and the production was really larger in those years when naval construction was under pressure. The export statistics show clearly how the Cleveland district has allowed itself to be distanced and how urgent the remodeling undertaken had been. It is only now beginning to bear some fruit, and undoubtedly it will no longer be possible that Belgian and German steel will be purchased by the works at Middlesbrough, as was the case in 1903.

One of the characteristic features of this reconstruction is the abandonment of the acid process, which is practically complete now so far as converters are concerned, and has already been undertaken for the open hearth furnaces. In 1903 the district produced 140,000 tons of basic open hearth steel, against 71,000 tons in 1902. Dorman, Long & Co. and Bolckow, Vaughan & Co. have gradually substituted basic Bessemer for acid Bessemer steel. To-day the former enterprise has changed its 19 open hearth furnaces into basic, and it is remarkable that 16 out of these were in operation at the end of 1903, when 22 acid furnaces out of the total of 73 of the Northeastern district were idle. The demand for low phosphorus pig iron had indeed dropped to such an extent that out of the 17 blast furnaces in operation Bolckow, Vaughan & Co. had only one running on Bessemer pig, which led to their reselling their Spanish ores.

The causes for this state of affairs have been the crisis in shipbuilding, the shutting down for the last two years of the greater number of the plate mills and angle mills, the acceptance on the part of Lloyds and of the Admiralty of basic metal, the high price of pure foreign ores, and, finally, the necessity of producing low priced metal to fight against the invasion of German billets and shapes. (During 1903 there were imported 65,000 tons of metal into the Cleveland district, of which 45,000 tons were steel billets.) The result has been that the importations of pure ores into the Northeast coast declined 125,000 tons during 1903, while the importations of phosphoric Swedish ores increased 135,000 tons. The increase in the production of the Cleveland iron ore mines of 250,000 tons corresponds with the increased demand on the part of Scotland for foundry iron. If the fact be considered, on the other hand, that the three new furnaces of the Cargo Fleet Company will be basic, that the new Spanish mines of the Consett Company yield phosphoric ores, and that the production of the seven acid open hearth furnaces of Bolckow, Vaughan & Co. will be small as compared with their basic steel plant, then the conclusion is reached that Cleveland, like Germany, is destined in the near future to produce almost exclusively basic steel.

Unfortunately Cleveland has not the means capable of supplying this output. The deposit, whose best portions are under the control of three or four companies, is even now yielding less than it did 30 years ago. The reserves are enormous, but of low grade. It will be necessary, therefore, to turn for pig iron for steel purposes to mixtures of Spanish ores, both pure and phosphoric, but comparatively inexpensive, with additions of Swedish ores, whose richness and abundance will undoubtedly render them more advantageous. The latter is probable for the basic Bessemer pig irons, and the increase in the shipments, which doubled nearly in 1903, is significant from this point of view.

The coking coal deposits of the Durham district are also limited, but the introduction of by-product ovens will make it possible to utilize other coals and at the same time considerably reduce the net cost of coke. Taking it altogether, the Cleveland district would, with its vast works and its proximity to the sea, be in a very favorable situation—equal at least to that of the Westphalian plants—if its producers had succeeded, like some of the

German plants, to assure to themselves large supplies of basic ores in Swedish Lapland. Until now they have only made some contracts on freights. It is true that one great English enterprise has been established at Dunderland, in Norway, in order to concentrate, purify and briquette low priced ores, but the tendency of the Cleveland district toward the basic process lessens its interest in this enterprise, at least so far as Middlesbrough is concerned.

We may estimate as follows, approximately, the cost per ton of production of pig iron for steelmaking purposes in the large works in the Cleveland district for basic open hearth metal:

	s.	d.
2,630 kg. of ore or clinder, at 4 shillings 9 pence.....	12	6
650 kg. of limestone, at 4 shillings 6 pence.....	2	11
1,175 kg. of coke, at 11 shillings.....	12	11
Cost of manufacture.....	4	6

Total, without general expenses or sinking fund.....32 10

As a matter of fact, foundry iron sold as low as 33 shillings 7 pence in 1894, and 42 shillings 3 pence in 1903.

The mixture of 30 per cent. imported ore would carry this cost to 37 shillings 7 pence, while basic Bessemer pig would cost 40 shillings 6 pence. The use of by-product coke ovens will make it possible to reduce these prices by 3 shillings to 3 shillings 6 pence.

The selling prices of Bessemer pig in the Cleveland district fell toward the close of 1903 to 50 shillings, and at that price the furnaces preferred not to continue its manufacture.

When it is considered that the Northeastern yards launched only 630,000 tons of shipping in 1903, as compared with 800,000 tons in 1902, and that the mechanical shops of all kinds are less developed in the Cleveland district than in Scotland, then it will be admitted that these facts imply a power of resistance very much greater than that of the three other British coast districts.

Summarizing, we may say that the Cleveland district is the most favored of all English districts, and, from our point of view, is one of the best situated regions in the whole world. The reconstruction which is going on actively now cannot help stimulating its development. In Wales the industrial concentration has, even in 1903, yielded interesting results. It has not yet had time to reach its finality through the improvement of the equipment and by the creation of simple and homogeneous works adapted to prevailing conditions in international competition. Scotland possesses, by the side of steel works of varying importance and value, a general organization which long ago would have called for very serious changes had it not been for the industrial power of the country and the special character of its products. The Northeast, finally, is only defending an inadequate economic and, to some extent, an inadequate financial situation by a happy specializing along the line of the production of rails.

The Cost of Production of Steel in England.

It will be readily understood that all direct estimates are impossible, in view of the varying conditions in each district and from one plant to another. But when the fact is taken into consideration that toward the close of 1903 the English works preferred to shut down or to use foreign billets rather than go below certain selling prices, then very significant indications are obtained by a study of these net selling prices and by comparing them with the minimum prices realized previous to this time under perhaps less precarious circumstances.

Prices at Works.

	1879.	1894.	Close of 1903.
	s. d.	s. d.	s. d.
Middlesbrough Bessemer pig.....	47 6	42 6	50 0
No. 3 Cleveland foundry.....	32 6	33 7	42 3
Heavy steel rails.....	90 0	73 6	90 0
Ship angles.....		90 0	95 0
Ship plates.....		92 0	105 0

Other Minima.

Cumberland district pig.....	40 7(1888)	42 9	54 0
Scotch Bessemer pig.....		43 6	....
Scotch foundry iron.....	37 1(1888)	40 0	50 6
Scotch ship plates.....		93 6	110 6
Scotch boiler plate.....		....	153 6
Tin plate bars, Wales.....		72 0	85 0

* Continued from *The Iron Age*, September 1, page 21; September 8, page 14; September 15, page 20, and September 22, page 20.

These prices did not, in the three periods named, leave anything but very close profits, and they may, therefore, be considered as cost prices, which include all charges.

It is fair, therefore, to draw the conclusion that the English cost prices for metal, leaving out of account the exceptional boom of 1899-1900, have risen in the last nine years from 15 to 20 per cent. for the great part of steel products, and from 17 to 26 per cent. for pig iron. This is due partly to the increase in wages, and to a greater extent, however, to higher raw materials. The finishing works, who control their own plants for the raw materials, ought in principle to have escaped from the rise in pig iron; but there are perhaps not more than three who are in a position that they have not suffered from that rise at all.

We have seen that, owing to the abundance of its fuel, England has succeeded in producing pig iron for steel manufacture at prices about equal to those of competing countries. It is in the manufacture of steel itself that its principal disadvantages appear, and this is due chiefly to too great a division in its productive equipment. From this fact all the rest follows, namely: Orders individually too small, intermittent manufacture, endless changing of rolls, inability to specialize plant, difficulty in writing off rapidly, a lessened interest in adopting the most modern mechanical improvements, and, notably, continuous rolling mills and corresponding shipping facilities, continuous heating furnaces, electrical charging machines, &c.

Finally, there are the high general costs, high maintenance and repairs. This scattering of plant is most noticeable in the case of open hearth furnace plants, so numerous in this country, in which the plate trade dominates so much. It is emphasized by a further disadvantage, the independence from one another of the plate mills and of the blast furnaces.

The concentration brought about by Guest, Keen & Co., by Dorman, Long, by Cargo Fleet, and the recent improvements in plants bring about a very important improvement from this point of view. These efforts, however, would be insufficient if a corresponding betterment were not brought about in the financial management of certain great English works. It is too often unstable, and lacks foresight, is too generous in dividends, too stingy as for reserves and judicious expenditures, and too often led by the profits of associated collieries or by affiliated industries to neglect plants and a supply of raw material for its steel works.

The British Tin Plate Industry.

From an editorial article in the *London Iron and Coal Trades Review* the following excerpt is taken:

There are no exact records of the total output of tin plates in Great Britain. In this respect the tin plate industry has acquired an unenviable distinction, due to the reserved and secretive disposition of many of the men engaged in it. There is no similar industry in the world of which the details are not more or less known. It is, however, computed that the total make of black and tin plates in 1903 has been well on to half a million tons, of which 353,000 tons were exported, and the remainder was absorbed in meeting home demands. Accepting this as an approximately correct figure, it would seem that we are still the leading tin plate manufacturing nation in the world, by, perhaps, 12,000 tons a year. And it also seems that we are not losing ground, despite the advances made by the United States, Germany and other nations, for our total exports of black and tin plates in 1903 was about 40,000 tons in excess of those of 1896, and those of 1902 were about 45,000 tons greater. Nevertheless the tin plate manufacturers are not content when they remember the "good old times," still comparatively recent, of 1891, when we exported over 448,000 tons, or 95,000 tons in excess of those of 1903, and when our total output was computed at 578,000 tons, or fully 80,000 tons more than that of last year.

This retrospect is, perhaps, calculated to inspire a pessimistic tone, but its antidote is to be found carrying the memory and the figures back to a still earlier period—not more than 20 years further—when the perspective of

our progress will be found more striking and effective. Until 1890 Great Britain had practically no competition in the tin plate industry. She has no competition to speak of even to-day. It is true that the United States have almost taken from us its own home market, which we monopolized until 1890, but that is all. Even yet we ship to the United States from 45,000 to 50,000 tons of tin plates annually, but this is only about an eighth part of our former shipments to that market. Germany produces well on to 20,000 tons of tin plates annually, but that does not even supply her own home needs, and most other nations have more or less to depend on British supplies, including Austria-Hungary, France, Spain and Russia, where tin plate plants are now in operation. It would be difficult to imagine any circumstances that could afford stronger proof of the inherent virility and soundness of this great industry.

It is, however, highly important to remember that this condition can only be maintained by increasing strenuousness on the part of both employers and employed. The Americans had, in the census year 1890, invested \$27,500,000 in the tinplate industry, and since then this amount has been greatly increased. The same country has made vigorous efforts to get ahead of South Wales in plant and equipment, and to some extent it has succeeded. What has been done in South Wales to combat this movement? We fear that the reply is not entirely satisfactory. A recent review of the trade by an acknowledged authority states that "although some obsolete mills have been remodeled, no new mills have been added to those in existence in 1891." It is now 13 years since then. Can it be supposed that the equipment 13 years ago is suited to the requirements of the present day? If this be so as regards tin plates, it is certainly not so as regards any other product of the iron and steel trades. The fact that South Wales has succeeded, despite all the inducements presented to other countries to dispossess her, in keeping her markets so well, should be great encouragement to our tin plate manufacturers to let nothing stand in the way of their keeping at the front. The only black page in our tin plate annals is that which deals with the McKinley tariff and its results. We may hope to open many new pages of a different character, if we only take care that we are entitled and competent to do so.

Electricity Day, September 14, marked the formal opening of the De Forest long distance wireless communication between the World's Fair grounds, St. Louis, and Chicago. This is the longest overland distance thus covered by wireless telegraphy. The Chicago station is on the lake shore on the north side of the city, originally erected by the Marconi Company for working between Chicago and Milwaukee. The messages from St. Louis, therefore, have to pass over something like ten miles of city buildings, including factories and steel skyscrapers. The opening of the service was witnessed in Chicago by W. J. Hammer and Prof. J. C. Kelsey, two of the jurors of award in the Department of Electricity at the World's Fair, and was witnessed in St. Louis by many members of the Electrical Congress, then in session. Messages were sent backward and forward for a period of two hours and were easily and accurately transcribed. Professor Goldsborough announced on behalf of the jurors that every message sent from St. Louis had been received at Chicago with accuracy. The De Forest Company now advertises in the daily papers a regular service between St. Louis and Chicago at Western Union rates. Messages are transcribed on blanks resembling telegraph blanks, the word "Aerogram" being used in place of telegram. It is announced that plans are rapidly nearing completion for a regular service between Chicago and New York and St. Louis and New York, as well as intermediate points.

Charles W. Irish, a prominent civil engineer, died at Gold Creek, Nev., September 28. Mr. Irish built the Royal Gorge and Grand Canyon bridges in Colorado, the bridge over the Missouri River at Omaha, the Northwestern Railroad through Iowa, the Santa Fé through Colorado and Arizona and the Burlington, Cedar Rapids & Northern through Iowa. He was one of the founders of Iowa City, Iowa, where one of his daughters now resides.

A New Code System.

Cablegram expense has become an important consideration to all manufacturers who engage in an extensive foreign business. Perhaps the machinery trade has felt this as much as any, for it frequently is urgent to transmit or verify orders or specifications more expeditiously than is possible by mail. Much thought has been given to the development of codes whereby this expense may be kept as small as possible, and, what is equally important, the likelihood of errors minimized. The result has been that most manufacturers have systems that are wholly or in part of their own origination, and, consequently, so unfamiliar to the cable companies that they are powerless to detect many of the mistakes occasioned by mutilations. A new code system has recently been copyrighted by Alexander M. Fisher, 45 Broadway,

Tabulation No. 1.

First Word, First Syllable.

TRANSLATION NUMERALS				1		1		1		1			
						2				2		2	
						3				3		3	
				ab	bu	ef	ge	ip	oh	ri	ub		
4				ac	by	eg	gi	ir	ol	ro	uc		
	5			ad	ca	eh	go	is	op	ru	ud		
		6		af	ce	el	gu	it	or	ry	uf		
			7	ag	ci	ep	ha	ix	os	sa	ug		
4	5			ah	co	er	he	iz	ot	se	uh		
4		6		al	cu	es	hi	la	ox	si	ul		
4			7	ap	cy	et	ho	le	oz	so	up		
	5	6		ar	da	ex	hu	li	pa	su	ur		
	5		7	as	de	ez	hy	lo	pe	sy	us		
		6	7	at	di	fa	ib	lu	pi	ta	ut		
4	5	6		ax	do	fe	ic	ly	po	te	ux		
4	5		7	az	du	fi	id	ob	pu	ti	uz		
4		6	7	ba	dy	fo	if	oc	py	to	za		
	5	6	7	be	eb	fu	ig	od	ra	tu	ze		
4	5	6	7	bi	ec	fy	ih	of	re	ty	zi		
Substitute for Repeated Syllables				bo	ed	ga	il	og					

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A New Code System.

New York city, which represents a product of long study, based on his experience as a foreign agent for American firms. The system has many meritorious claims, which seem well substantiated by an investigation of its principles. In the order of their importance these are: Simplicity, as it may be quickly comprehended; brevity, as many ideas can be conveyed in one or a few words, and accuracy, as mutilations are made improbable, and even when they occur they are easily detected. The system is designed to take the place of codes compiled on the "digit" or "root and terminal" systems, but the inventor modestly explains that it is not offered as the only code system, for other systems have applications in which they should be preferred. It is stated that it does not compete with dialogue codes, but is used in connection with them in many instances. The system enables one to make artificial words of ten letters each which will convey any or all of 35 ideas. All combinations are pronounceable, so that the code comes within the ruling of the International Telegraph Conference of 1903 that a word is considered to be a pronounceable combination of not more than ten letters.

A word always consists of five syllables of two letters, a vowel and a consonant, or *vice versa*. Each syllable may express from one to seven ideas in any combination. The accompanying specimen page shows the manner in which a syllable is selected to express any combination of these seven ideas. An idea may be a word, a phrase, a combination of phrases, a numeral or an arbitrary sign, &c. Each user compiles his own translation key, collecting his ideas preferably in the order of their most frequent use, as this enables the use of the least words in each message, as will be shown later. In the translation key the ideas are numbered consecutively. The tabulations for second, third, fourth and fifth syllables of the first word and the five syllables for the second, third and fourth words are the same as for the first syllable of the first word, except that in place of the numbers 1 to 7 the succeeding numbers in order are used. It will be seen, then, that the significance of a syllable depends upon its position in a word.

If the sender desires to transmit ideas, say, 1, 3 and 6, he refers to the code, where it will be found that the syllable "or" is the corresponding one, and so on for the balance of the word. Each syllable in a word must be used. If the sender has no occasion to use ideas from 1 to 7, 8 to 14, &c., he substitutes syllable "ab," which has no significance. Should it happen that two succeeding syllables are identical, one or another of the substitutes at the bottom of the page may be used for these repeated syllables. If the ideas to be conveyed are further down the line than No. 35, the sender still has to use the first word, which might then consist of "abboedgall," for instance, and the receiver will at once discover that none of the first 35 ideas are referred to. Similarly, the second word might be the same, if the ideas are still beyond the first 70. This is the reason why it is desirable to place the most used meanings in the first part of the translation key.

In arriving at quantities use is made of the geometrical progression, 1, 2, 4, 8, 16, &c. With this series any number can be made by adding the quantities which produce its sum, and transmitting the key numbers which correspond to them, 1, 2, 3, 4, 5, &c., the numbers of the series being in this case the ideas. Various geometrical progressions may be used, according to the unit of difference desired—that is, they may be multiples of 50 or of a fraction. These included in the key make it possible to send dimensions of machines, &c.

When in the transmission of a code word a word is spelled differently at the delivering office than it was intended, it is said to be mutilated. The most frequent causes of mutilation are probably poor handwriting and careless reading of handwriting. Mutilations are also caused by confusion in the transmission of the telegraphic signals, where the space between letters is misunderstood. Such mutilations may be detected, since they alter the number of letters in a word, and as all of the words in the Fisher system must have ten letters, it is at once recognized that there is some mistake. Mutilations from handwriting are largely obviated by avoiding combinations of letters which resemble other combinations. For instance *j* is not used, as its combination with *i* resembles *y*; *k* is also omitted, as it is sometimes read for *h*; *m*, *n*, *q*, *v* and *w* are also omitted for similar reasons. Letters *g* and *y* are sometimes misread also, but as *g* occurs only in combination with vowels, and *y* with consonants, mistakes from their use are not likely to occur.

As illustration of the use of the code, we will say that a manufacturer has the following translation key for the first word:

Transla- tion numerals.	Meanings.	Transla- tion numerals.	Meanings.
1		19	Taper attachment.
2		20	German tall stock.
3	Engine lathes.	21	Turret on carriage.
4		22	1
5		23	2
6		24	4
7	Inch swing.	25	8
8		26	16
9		27	Plain chuck.
10		28	Universal chuck.
11		29	Combination chuck.
12	Foot bed.	30	36
13		31	36
14		32	36
15		33	1
16	Plain rest.	34	Face plate jaws.
17	Raise and fall rest.	35	Back geared lathe.
18	Compound rest.		

If the sender desires to order five engine lathes, 14-inch swing, 6½-foot bed, plain rest, compound rest, taper attachment, 12-inch combination chuck, 1½-inch drill chuck, face plate jaws, back geared lathe, from his key he finds that the translation numerals which he must send are 1, 3, 6, 7, 8, 10, 12, 13, 16, 18, 19, 24, 25, 29, 32, 33, 34 and 35, and selects the syllables accordingly from the code, getting all his ideas from 1 to 7 in the first syllable, 8 to 14 in the second, &c. In translating the code word the receiver has only to find the numbers corresponding to these syllables, and referring to the key determines the meanings conveyed. There are many other illustrations which might be cited of the various applications which may be made of the system, and there is an almost endless possibility in the selection of translation keys. If the user has several different translation keys, he may use the preliminary word to indicate which key is referred to, thus saving a number of useless words which would be required if his ideas were contained in one long translation key.

An interesting possibility of the system is the means for checking a message. Having selected his words for the message, the sender may add up the translation numerals, and send their sum in a last word or last syllable of each word, to be translated by means of a key in which the translation numerals are serial and the meanings a geometrical progression of two. The receiver adds up the translation numerals, and if they do not agree with the sum transmitted in the last word has the message repeated.

More than 600,000 new telephones have been installed by the American Telephone & Telegraph Company during the past year, bringing the total number used by Bell subscribers up to above 3,375,000—that is, one Bell telephone for every 24 persons in the United States. These telephones are served by nearly 4,000,000 lines of wire—enough to make a 16-wire cable to the moon. The daily average of messages was last year upward of 10,000,000, the total number of messages for the year being therefore in excess of 3,650,000,000, or about 45 per head of the entire population of the nation.

So-called "automobile trains" have been introduced upon the lines of the Parish & Lyons Mediterranean Railroad in the service between Paris and Montereau, a distance of 45 miles. Each car is 36 feet long, 8 feet wide and 9 feet high, and has accommodations for 12 first-class and 24 second-class passengers, besides 12 more, who can be carried upon a platform at the rear of the car, arranged like an observation platform. The initial cost of the automobile car is stated to be about \$8000, as compared with a cost of \$22,000 for the ordinary steam locomotive.

A large quantity of coal is said to be consumed in China which is not included in any general statistics. In the one province of Shansi, which is supposed to have a population of from 15,000,000 to 20,000,000, nearly all the inhabitants burn coal, and an estimate of 5,000,000 tons for this one province would not be excessive. The coal used in the Shansi blast furnaces alone would amount to several hundred thousand tons. At the present time about 50,000 tons of pig iron are made in Shansi annually. The iron industry of Shansi was the most important in China until the Viceroy Chang Chi Tung established the Han Yang works, near Hankow.

The unsatisfactory reports regarding the working of accumulator batteries are, in many cases, traceable to the use of an acid of inferior quality. Acid for battery work should be made from the best Sicilian sulphur, and should be entirely free from chlorides, nitrates, lead and iron, all of which are found in greater or less degree in ordinary commercial acid. Another point is that ordinary tap water charged with iron, chlorides or other injurious materials, is frequently used for diluting the acid. Only distilled water should be used, if the best results are desired.

The New York Subway.

Last Monday a party of about 100 or more technical and daily newspaper men was taken on an exhibition trip through the New York Subway, under the guidance of E. P. Bryan, vice-president of the Interborough Rapid Transit Company. The train of six cars started from the Brooklyn Bridge at 2.37 p.m., and reached Ninety-sixth street, where the first stop was made, in the remarkable time of 10¼ minutes, having covered a distance of 7 miles; 6¾ minutes later the train was at 145th street. The promise of "the Battery to Harlem in 15 minutes" does not seem so rash as it did when made four years ago by William B. Parsons. On the return trip the party was given the opportunity of inspecting the big underground stations at Forty-second and Twenty-third streets.

The main line of the subway will be opened on October 27 as far north as 145th street. Express trains will be run under a two-minute headway during the rush hours, 7.30 to 9.30 a.m., and 4.30 to 6.30 p.m. These will make three stops between the Brooklyn Bridge and Ninety-sixth street, and from there up will stop at all stations. Express trains will consist of eight cars, with a seating capacity of 52 each and standing room for 100 more, making the capacity of a single train 1200, and the number of persons that can be carried during two rush hours 72,000. In the rush hours local trains of five cars each will operate with a one-minute headway, and during that time can handle a maximum of 90,000 passengers. The average running time for the local trains between Ninety-sixth street and the City Hall will be 20 minutes, or five minutes longer than the express time. All through the day the express trains will be run every 15 minutes and the locals every three minutes. After the rush hours at night the express trains will run every half hour until midnight. The locals will run every three minutes, and from 1 to 4 a.m. every ten minutes.

Emergency crossover switches have been provided at several points, so that if an express train becomes stalled the following trains can be swung over the local tracks without material loss of time. An automatic signal system with tower switchmen will safeguard these interlocking points to lessen the liability of accident from making the movement.

MANUFACTURING.

Iron and Steel.

The Seamless Tube Company of America, which is to erect a plant at Monessen, Pa., has increased its capital stock from \$5000 to \$1,000,000.

The Ellis & Lessig Rolling Mills, at Pottstown, Pa., have resumed operation under the ownership of Geo. B. Lessig, and later on will be operated under the name of the Lessig Brothers Iron & Steel Company.

The closing down of the works of the Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., for a few days last month to make some necessary repairs led to an incorrect statement being made in these columns a few weeks ago to the effect that the plant had closed down for a week on account of slack business. The company has been receiving more orders than it is able to fill during the last few weeks and its business has never been more prosperous.

The new blast furnace plant of the Buffalo & Susquehanna Iron Company, located on the outer harbor of South Buffalo, N. Y., made its first cast of pig iron September 28, every detail of the blowing in going off satisfactorily. This pair of furnaces represents the most advanced step in blast furnace construction, and each stack has a daily capacity of 400 tons. William A. Rogers is president, and Hugh Kennedy, manager. The product will be handled by Rogers, Brown & Co.

At the annual meeting of the New Haven Iron & Steel Company, held in Camden, N. J., October 3, the old Board of Directors was re-elected, as follows: Charles A. Porter, Kennedy Crossan, C. C. Kaufman, A. Loudon Snowden, John W. Peddle, Joseph W. Yocum and George D. Watrous.

The Lackawanna Steel Company, Buffalo, has recently installed a complete system of magnetic switch control for five ore unloaders and also magnetic switch controller equipment for a No. 3 unloading ore bridge, the apparatus being furnished by the Electric Controller & Supply Company, Cleveland.

The 10-inch mill at the lower plant of the Carnegie Steel Company, at Youngstown, Ohio, has been placed in operation.

The 16-inch bar, 8-inch continuous and 8-inch guide mills at this plant have been running full for some time. A strike has been on at this plant for some weeks, but practically the entire mill is now in full operation.

The blast furnace of the Belfont Iron Works Company, at Ironton, Ohio, has been blown out. The stack will be torn down and a new one erected in its place.

The New Castle Forge & Bolt Company, New Castle, Pa., has erected extensive factories in the past two years for the manufacture of bolts, nuts, rivets, car forgings and chain, and is now receiving bids for a complete rolling mill plant, to consist of a 12-inch bar mill, muck mill, scrap and puddling furnaces.

The Monongahela Works of the American Sheet & Tin Plate Company, on the South Side, Pittsburgh, which have been idle for some time, will be started up on Monday, October 10. The plant contains eight hot and eight cold mills, the annual capacity being 18,000 gross tons of tin and terne plate.

The Carnegie Steel Company, Pittsburgh, made a shipment last week from the Homestead Steel Works of about 1200 tons of nickel steel plates for the Japanese Government.

General Machinery.

A five-story brick factory building, 25 x 95 feet, is to be erected by A. P. Dienst & Co., Third avenue and 140th street, New York. The greater part of the building will be used for stock rooms, the front basement for boiler and engine room, and the second floor for machine and pipe fitting shops.

George W. Curtis has been appointed receiver for the Curtis & Wilson Machine Company, New York.

The Central Machine Company, Niagara Falls, N. Y., has moved into its new factory building, recently completed at Lawrence avenue and Thirteenth street. The building is 60 x 120 feet, two stories, and equipped with modern machinery. The company makes a specialty of repairing electric machines.

The Cataract Machine & Automobile Company, Niagara Falls, N. Y., recently incorporated with a capital stock of \$5000, is located in the old Central Machine Company's shops, where it will do general machine work, making a specialty of automobile repairing and adjusting. H. W. Kellogg is president; F. V. Simpson, vice-president; W. A. Scott, secretary, and Max Amberg, treasurer.

The only new tools required by the Lorain Steel Company, Philadelphia, for equipping the extension to its plant at Johnstown, Pa., will be seven electric motors, ranging from 10 to 30 horse-power.

Robert S. Armstrong & Bro., Atlanta, Ga., iron brokers and dealers in new and second-hand machinery, are moving into their new building, 50 x 100 feet, on Marietta street. The firm contemplates erecting another building in the near future.

The new laboratories of Syracuse University will be equipped with hydraulic and steam apparatus, forges, metal working machines, wood working machinery, &c. A large part of this equipment has already been purchased.

The Bartlett-Tewksbury Machinery Mfg. Company, Birmingham, Ala., intends making additions to its new plant, which already contains 150 square feet of floor space. The company manufactures steam engines and saw mill machinery. T. E. E. Bartlett is president; I. F. Young, vice-president, and J. W. Tewksbury, secretary and treasurer.

The Buckeye Machinery Company, Columbus, Ohio, recently incorporated with a capital stock of \$30,000, has succeeded to the new and second-hand machinery business of G. W. Shartle. The officers and directors are: G. W. Shartle, president; C. F. Andrews, vice-president; J. A. Taft, secretary and treasurer, and O. T. Snyder.

The Galena Iron Works Company, Galena, Ill., has filed articles of incorporation in Wisconsin and will establish a branch office at Plattsville, Wis. It is the purpose of the company to erect a new building, 30 x 80 feet. A drill press, lathe and planer and steel hammer will be required.

W. E. Jamieson, formerly a member of the firm of Jamieson-Combe Iron Works, St. Joseph, Mo., has disposed of his interest to his associates. Mr. Jamieson has purchased property and it is his purpose to immediately erect a building suitable for a modern machine shop, which he will conduct in company with his two sons. He is now in the East for the purpose of purchasing equipment and expects to have the shop in running order by December 1, 1904.

The fire which recently damaged one of the Fay erecting shops of the J. A. Fay & Egan Company's wood working machinery plant at Cincinnati, Ohio, will not prevent filling orders as usual. A large part of the force of men employed in these shops have already resumed work and the remainder have been transferred to the Egan shops and their regular work continued as if nothing of the kind had occurred. Provision for just such a possibility had been provided for under the elegant system in which this company is handled.

Greenlee Bros. & Co., makers of wood working machinery, have begun the removal of their plant from 225 West Twelfth street, Chicago, to Rockford, Ill. Their unpleasant experiences

with union labor in Chicago, coupled with a desire for more space and more direct railroad facilities, prompted the removal.

Power Plant Equipment.

The Archibald-Brady Company, Syracuse, N. Y., has been awarded the contract for the construction of a power station at Mendon, Vt., to cost \$125,000. It will be used in connection with the great reservoir built at Chittendon, Vt., by the Chittendon Power Company, and will develop from 2000 to 4000 horse-power.

The Browne Corliss Engine Company, Corliss, Wis., has just shipped a large air compressor to the J. I. Case Plow Works, Racine, Wis.

The Erie City Iron Works, Erie, Pa., has let the contract for its new boiler shop. The structure will be about 150 x 660 feet, 45 feet high, and will be built of steel and iron. It is expected that part of the building will be ready for occupancy within a few weeks and the whole finished before June.

The plant of the American & British Mfg. Company, Providence, R. I., was not damaged to any extent by the recent fire.

The Birmingham Boiler Works, Birmingham, Ala., now has its new plant in full operation. The company reports enough orders on hand to keep the plant running full for 60 days.

The Backstrom Mfg. Company has been incorporated at Milwaukee, Wis., by T. J. Neacy, Chas. Backstrom and Walter Reed, with a capital of \$50,000. The company is preparing to exploit the turbine engine controlled by the Backstrom-Smith Steam Turbine & Mfg. Company, which was organized two years ago. Patents have been applied for in foreign countries. For the present the machines of the company will continue to be made in the shops of the Flier & Stowell Mfg. Company, Milwaukee, as the officers of that company are largely interested in the new organization. Eventually it is likely that a separate plant will be necessary for the expansion of the business. One large turbine of 640 horse-power has been in operation at the Flier & Stowell Company's works for some time, and it is probable that several others will be constructed soon.

The Chandler & Taylor Company, Indianapolis, Ind., will erect a boiler shop, which will be 110 x 180 feet. The site occupied by this company covers 22 acres and lies between the Big Four and the Vandalia railroads.

The Allegheny Machine & Iron Company, 1401 Arrott Building, Pittsburgh, has been appointed sole Eastern agent for the automatic gas producer, made by the American Gas Machine Company. It is said gas can be made by this machine at a cost of 18 cents per 1000 feet, and while the machines are designed for the production of illuminating gas, it is claimed the product can be used to advantage in the operation of gas engines.

The Sovereign Engine & Construction Company has been incorporated through the law offices of Crandall & Hunter, 302 Broadway, New York.

Foundries.

The new plant of the Iowa Malleable Iron Company, Fairfield, Iowa, was placed in operation September 21. The main foundry is 106 x 142 feet. The other buildings include a cleaning room, 42 x 108 feet; office and pattern shop, 32 x 42 feet; shipping and annealing rooms, 86 x 118 feet; engine and boiler rooms, 24 x 48 feet and 21 x 35 feet; core room, 16 x 64 feet, and smaller buildings.

The Illinois Malleable Iron Company, Chicago, has extended its charter by filing new articles of incorporation, the issued capital stock being \$452,900. The incorporators are Henry E. Bullock, who is president; James E. Bullock, secretary and treasurer, and James D. Sheehan.

The Vulcan Foundry & Iron Works, Atlanta, Ga., which was incorporated in August, has erected a plant, 50 x 90 feet, on Marietta street, for the manufacture of iron castings.

Thomas Prosser of Thomas Prosser & Son, New York, is president of the recently organized Contractors' Supply Company. It is not the intention to erect a plant, the business of the company being the furnishing of contractors' supplies, principally in the line of castings for municipal and builders' work.

Fires.

The Fries-Breslin Company's rug factory at Camden, N. J., was destroyed by fire October 3. The loss is estimated at \$400,000.

The Hopewell Spool & Bobbin Company's factory at Trenton, N. J., was damaged \$10,000 by fire last week.

The plant of the Watertown Door & Sash Company, Watertown, Pa., was destroyed by fire October 1. The loss is placed at \$75,000.

An explosion of a tubular boiler completely wrecked the Franklin Iron Works, Port Carbon, Pa., October 2.

The main building of the plant of the American Sheet Iron Company, Phillipsburg, N. J., was destroyed by fire October 1. The loss is placed at \$100,000.

A number of concerns suffered damage by fire and water on Atlantic avenue, Boston, September 29, including Pettingill-Andrews Company, dealer in electrical supplies; Agnew Auto-Mailing Machine Company, Boston Coupling Company, and S.

H. Couch & Co., telephone manufacturers. The total loss is placed at \$25,000.

Bridges and Buildings.

The Richards Iron Works, Birmingham, Ala., has just completed a contract for supplying the steel work in the new Clay County (Ala.) jail and has on hand several contracts for elevators.

Hardware.

The Wenzelmann Mfg. Company, manufacturer of hardware specialties, announces its removal from Streator, Ill., to its new plant at Galesburg, Ill. The new plant comprises 11 acres and is served by both the Santa Fe and Chicago, Burlington & Quincy railroads.

The Western Screen Company, Waukegan, Ill., sustained slight damage by fire recently, the loss being fully covered by insurance. Operations at the plant will be resumed shortly.

The North Wayne Tool Works, Hallowell, Maine, is making extensive improvements to its plant at North Wayne, Maine, including the construction of a new stone dam and the replacing of old water wheels with turbines of modern type. This will considerably increase the company's power, which is necessary because of the large increase of the business.

Miscellaneous.

Owing to the success which the American Steel Package Company, Defiance, Ohio, has had in galvanizing its own product by both the hot spelter and electrolytic processes, the company has enlarged its plant and is now prepared to give the trade prompt service on all classes of galvanizing work. The pressed steel department is equipped with the latest improved machinery for light and heavy stamping.

The Beebe Roofing & Tank Company has incorporated at Muncie, Ind., with \$10,000 capital stock. The directors are Rolfe R. Beebe, Edgar L. Minnich and Dr. R. T. Miller.

Indianapolis (Ind.) building contractors have organized and incorporated the Contractors' Brick Company, with \$250,000 capital stock. A plant will be built for the manufacture of brick. Wm. P. Jungclauss is president; Fred Grossart, secretary, and Wm. Bossert, treasurer.

The citizens of Converse, Ind., are making an effort to raise \$10,000 to get the National Car Coupler Company to open its plant there, which has been closed for several months. The company now offers to open and enlarge it if the citizens will give \$5000 and take \$5000 of stock. The plant employs 200 men when in full operation.

The Center Friction Pulley Company has incorporated at Indianapolis, Ind., with \$12,000 capital stock. The directors are Robert C. Berry, Calvin F. Duke and Ira J. Ross.

The National Drill Works, Cambridge City, Ind., has been sold to the Reddick-Lean Mfg. Company, Mansfield, Ohio. The plant manufactures drills and plows.

The Vehicle Apron & Hood Company, Columbus, Ohio, whose plant was destroyed by fire recently, has leased a new factory, with a floor space of 15,000 square feet, and has equipped it with the most modern machinery. Electrical power will be used throughout the factory, each department being served with a separate motor.

The American Shipbuilding Company, Cleveland, has closed contracts for two more modern freight steamers costing upward of \$800,000. This makes five vessels that the company has under contract for 1905 delivery. The vessels ordered last week will be larger than the boats that lake builders have been awarded contracts for lately, and in size and carrying capacity will rank next to the steamer "Augustus B. Wolvin," which holds the record for large cargoes on the lakes.

The Consolidated Mfg. Company, Toledo, which is the consolidation of the Kirk Mfg. Company, manufacturer of bicycles and automobiles, and the Snell Cycle Fittings Company, manufacturer of forgings, bicycle and automobile fittings, has acquired the factory of the Yost Mfg. Company, including about 35,000 square feet of manufacturing space located a short distance from the two plants above mentioned. The building will be utilized entirely for the production of a new gasoline touring car, which will be placed on the market for next season. The machine will be a light two-cylinder car, and the company is planning to build 1000 of them. The company is also preparing to put out a large four-cylinder touring car. At a meeting of the company last week the following officers were elected: E. T. Breckenridge, president; Ezra Kirk, vice-president; A. W. Colter, secretary, and J. B. R. Ransom, treasurer. These officers and E. W. Tolerton constitute the Board of Directors.

The Indiana Scale & Truck Company, Toledo, Ohio, has been incorporated with \$100,000 by Samuel Snell, Robert B. Dakin, George F. Muller, John Renner and Rathbun Fuller. The company will make truck scales, automobiles, hardware specialties and machinery. The company is a reorganization of Toledo people of the company of similar name which has been doing business at Bluffton, Ind. The company will push a combination scale and truck. The factory will remain at Bluffton.

Edgar B. Seidel, Waterbury, Conn., is building an addition to his crucible works in the city, the new building being 32 x 80 feet and two stories, the present building being 40 x 80 feet and four stories. A kiln will be erected in the center of the addition, to be 20 feet in diameter and 55 feet high. As soon as

the improvements are completed the business will be incorporated as the Bridgeport Crucible Company.

The business of the Dean, Whiting Elevator Company, Worcester, Mass., has been acquired by a new Massachusetts corporation known as the National Plunger Elevator Company. The officers are: President, Chester F. Hall; treasurer, Harold D. Van Norman, and secretary, George F. Ramponi. The authorized capital stock is \$50,000. It is the purpose of the corporation to continue the shop at Worcester, but the main office will be in Boston.

The Frazer Hollow Spar & Boat Company, recently organized for the manufacture of hollow spars, canvas covered canoes, row boats, launches, &c., has taken over the plant and business of the Whitestone Hollow Spar & Boat Company and will move the office and works from Whitestone Landing to Greenport, N. Y.

The Lion Spoke Works, Chattanooga, Tenn., has purchased the Geo. Becking Mfg. Company's plant at Chattanooga and will remodel and equip it for the manufacture of first-class hickory wagon and buggy spokes. The cost of the plant was \$12,000, including one 100 horse-power boiler and one 90 horse-power engine. All the necessary machinery equipment has been purchased from the Defiance Machine Works, Defiance, Ohio.

The Standard Stove Works, which has been erecting a plant at Columbus, Miss., began operations September 26 with a working force of 60 molders. The plant has a capacity of 150 cook stoves a day, which, the company states, is sold ahead for 30 days. Boiler and engine for the plant were purchased from the Atlas Engine Company, Indianapolis, Ind.; blower from the Buffalo Forge Company, and the cupola was made by the Southern Bridge Company, Birmingham, Ala. The company is capitalized for \$150,000, all paid in. D. R. Saunders is president; L. J. Folsom, secretary, and W. T. Folsom is treasurer.

The Round Mountain Iron & Wood Alcohol Company, Cincinnati, Ohio, has increased its capital stock from \$100,000 to \$250,000, the purpose being to reconstruct its wood alcohol plant at Round Mountain, Ala., with the most complete modern methods of carbonating wood and refining alcohol and wood products.

The Scott Incubator Company, Indianapolis, Ind., will build a factory at Abingdon, Ill., which will be 50 x 92 feet. The company is in the market for a 20 horse-power boiler and engine and wood working machinery. Bids are desired on both new and second-hand equipment.

The Burt Mfg. Company, Akron, Ohio, which manufactures the Cross oil filters, has developed an extensive export business. Recent shipments abroad include five to Finland; three to Havana, Cuba; four to Valparaiso, Chile; six to St. Petersburg, Russia; 27 to Genoa, Italy; 12 to Sweden, and three to Calcutta, India. The company recently furnished a large oil filter for the Rock Island Arsenal, a number for the different plants of the United States Steel Corporation, one for the National Steel & Wire Company, New Haven, Conn.; two for the Lehigh Valley Coal Company; two for the La Belle Iron Works, Steubenville, Ohio, and one for the Otto Gas Engine Works, Philadelphia.

The Franklin Power Company has been incorporated in Massachusetts to take over the manufacturing plant of Linn & Field, Incorporated, Greenfield, Mass., shoe manufacturers, which recently went into liquidation. The incorporators are C. W. Stevens, J. H. Sanderson, N. S. Cutler, D. C. C. Field and Charles H. Keith. It has not been determined to what purpose the property will be put.

The B. Henley Swivel Coupling Company has been organized at Youngstown, Ohio, with a capital of \$10,000, and is erecting a plant at Edenburg, near Youngstown, for the manufacture of a swivel coupling for carriages and other vehicles.

The Le Manquais Electrical Mfg. Company has been incorporated to take over the business of the Le Manquais Iron Cabinet Company, Brooklyn, N. Y. The company makes special panel and switchboards and iron panel cabinets. An addition 20 x 50 feet will be erected and two 8 x 8 foot enamelling ovens will be installed.

The McKay & Dix Verona Island Shipbuilding Company, which is owned by McKay & Dix, New York, has lately installed new machinery and made other improvements at its shipyard at Verona, Maine. A new electric light plant is being put in. The company will build the new Arctic exploration ship for Commodore Peary.

The Rogers Automobile Company has been incorporated to manufacture automobiles of an improved type at Springfield, Mass. The office of the company is at 68 Bridge street, in that city. Plans for manufacturing have not been completed.

The Pittsburgh Engineering Company, Pittsburgh, is building a large new plant at Butler, Pa.

The Carnegie Steel Company is considering the question of putting up two blowing engines at the Edgar Thomson furnace plant to be driven by gas engines using waste blast furnace gas. The contract has not yet been let.

The Iron and Metal Trades

The growing confidence in the general business situation and in Iron circles in particular is beginning to show itself in an increased volume of buying. It is not very much to brag of yet, but it looks clearly as though we were at last heading in the right direction.

The railroads are buying somewhat more freely. Some pretty good orders for rolling stock have been placed, among them one lot of 3000 Steel cars for the Erie road. In the aggregate the orders for Steel Rails in small lots figure up rather surprisingly well.

The lake shipbuilders have taken five additional vessels, making a total of nine for which the material, aggregating about 30,000 tons, has been placed. It is understood that the United States Steel Corporation contemplates placing an order for four or five large carriers at an early date.

The disposition both of sellers and of buyers is still to proceed very conservatively until the future has shaped itself. Thus, in staple lines, like Wire products, the leading interest will not sell beyond 60 days, and in other branches a similar attitude is maintained.

What the effect of a full resumption on the part of the Southern furnaces will be is problematical. The companies are said to be gaining slowly in their struggle for an open shop with their miners.

The export movement is gaining in volume and is assuming a more cheerful aspect. The leading interest is shipping now at the rate of 125,000 tons per month, and is reported to have sold, some two weeks since, about 50,000 tons of Sheet Bars at prices which show an advance of \$1 per ton over those realized on the old contracts.

No individual large transactions are reported in any of the finished lines, but there is quite a good inquiry and a fairly large tonnage is being figured on.

Pig Iron has gained somewhat in strength in nearly all the leading markets. It is reported that the stock carried by two of the Southern furnace companies has passed into stronger hands, and, generally speaking, the attitude of makers in that section is firmer, with very little Iron available at the minimum prices only recently quoted. In Pittsburgh one interest has taken about 10,000 tons of Foundry and Forge Iron.

Generally speaking, founders are moving cautiously in their purchases, and it is noted that while buying is light early in the month, it swells in volume as the month proceeds, the business done being generally for prompt and early delivery. Inquiries for extended delivery are met with a demand for a premium over present prices, and in nearly all cases lead to the withdrawal of the buyer. It is a waiting market, with the outlook apparently in favor of the seller.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Oct. 5, Sept. 28, Sept. 7, Oct. 7,
1904. 1904. 1904. 1903.

PIG IRON:

Foundry Pig No. 2, Standard, Philadelphia	\$14.25	\$14.25	\$14.25	\$15.25
Foundry Pig No. 2, Southern, Cincinnati	12.00	12.00	12.00	13.75
Foundry Pig No. 2, Local, Chicago	13.50	13.50	13.50	15.00
Bessemer Pig, Pittsburgh	12.85	12.85	12.60	16.10
Gray Forge, Pittsburgh	12.00	11.75	11.75	14.25
Lake Superior Charcoal, Chicago	15.25	14.75	14.70	19.00

BILLETS, RAILS, &c.:

Steel Billets, Pittsburgh	<i>19.50</i>	19.50	20.00	27.00
Steel Billets, Philadelphia	<i>21.50</i>	21.50	22.50	26.00
Steel Billets, Chicago	22.50*	22.50*	20.00	28.00
Wire Rods, Pittsburgh	26.00	26.00	26.00	34.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	11.00	11.00	10.50	14.00
O. Steel Rails, Philadelphia	12.25	12.25	....	14.25
O. Iron Rails, Chicago	16.25	16.00	16.00	17.00
O. Iron Rails, Philadelphia	15.50	15.50	15.50	17.50
O. Car Wheels, Chicago	11.25	11.00	11.00	18.00
O. Car Wheels, Philadelphia	12.00	12.00	12.00	16.00
Heavy Steel Scrap, Pittsburgh	12.00	11.50	11.50	16.00
Heavy Steel Scrap, Chicago	10.50	10.00	....	13.00

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.43½	1.43½	1.48½	1.50
Common Iron Bars, Chicago	1.35	1.35	1.35	1.50
Common Iron Bars, Pittsburgh	1.30	1.30	1.25	1.50
Steel Bars, Tidewater	1.44½	1.44½	1.45	1.73½
Steel Bars, Pittsburgh	1.30	1.30	1.30	1.60
Tank Plates, Tidewater	1.54½	1.54½	1.54½	1.78
Tank Plates, Pittsburgh	1.40	1.40	1.40	1.60
Beams, Tidewater	1.54½	1.54½	1.54½	1.73½
Beams, Pittsburgh	1.40	1.40	1.40	1.60
Angles, Tidewater	1.54½	1.54½	1.54½	1.73½
Angles, Pittsburgh	1.40	1.40	1.40	1.60
Skelp, Grooved Steel, Pittsburgh	1.30	1.30	1.30	1.55
Skelp, Sheared Steel, Pittsburgh	1.35	1.35	1.35	1.65
Sheets, No. 27, Pittsburgh	2.00	2.00	2.00	2.55
Barb Wire, f.o.b. Pittsburgh	2.05	2.05	2.05	2.60
Wire Nails, f.o.b. Pittsburgh	1.60	1.60	1.60	2.00
Cut Nails, f.o.b. Pittsburgh	1.60	1.60	1.60	2.15

METALS:

Copper, New York	12.87½	12.75	12.62½	13.25
Spelter, St. Louis	4.95	5.00	4.92½	5.60
Lead, New York	4.20	4.20	4.20	4.40
Lead, St. Louis	4.12½	4.12½	4.10	4.30
Tin, New York	28.25	27.85	27.50	26.00
Antimony, Hallett, New York	7.00	7.00	7.00	6.25
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.49	3.49	3.49	3.99

* Nominal.

Chicago.

FISHER BUILDING, October 5, 1904.—(By Telegraph.)

Almost every man intimately associated with the Iron and Steel industry will tell you this week that business is greatly improved and that the outlook is much brighter than it has been, and yet when you pin him down to quote facts he will acknowledge that orders are really little, if any, better, except in the case of Pig Iron and Bars. There must be something in the air this week that gives the Chicago citizen a buoyancy and hopefulness, and it is very evident that such a feeling has seized the trade here. It is true that inquiry here is better in other lines also than the two named, but there has not yet been time to determine whether this inquiry will result in orders or not. It may be that the better times for which we have all been looking have already come, or it may be that this is another false start such as we took the first week in August. Time alone will tell. It is quite the rule for inquiries and orders to be heavier the first week of any month, as buyers of material are keen to delay the evil day of paying as long as possible, and recognize that billing is done ordinarily at the end of each current month. There is no doubt, too, that the establishment of the new set prices on Billets, Structural Material and Plates, even though the new prices were not satisfactory, has had a favorable effect on the trade, as any price, no matter how unsatisfactory, is better than no price.

Pig Iron.—There is decided strength in this market, and while the week's sales are not characterized by any extremely large lots, the aggregate of the vast number of small orders is large. There is a determined effort on the part of buyers to cover for next year's requirements at present prices, but one in which they are metting with small success. Some business for Northern Iron is being closed for 1905 at 50c. premium over current prices, and sellers are encouraged to believe that the time is not far distant when buyers will avail

themselves of the opportunity of covering for the first half of next year at prices that promise to be considerably lower than the current figures that are looked for next spring. While there is great strength in the Southern field also, it is due largely to the restricted output, owing to the continuation of the Coal miners' strike. Buyers will not listen to a proposition based on a premium for 1905 contracts for Southern Iron, because they believe that as soon as strike conditions cease in the South producers will be so eager for business as to hold prices down to a comparatively low level. One large Southern producer announces that the large sales closed by him last week have thrown his firm out of the market for the balance of 1904, and that he is averse to booking much business now for 1905 delivery at present prices. We advance Lake Superior Charcoal Iron 50c.; Southern, No. 4, which for a long time was sold on the basis of Gray Forge, 50c., and Gray Forge, Mottled and White, each 25c.; Ohio Strong Softeners we reduce 25c. In the following list the lower prices of Northern Irons quoted are for 1904 shipment and the higher prices for 1905. We quote:

Lake Superior Charcoal.....	\$15.25 to \$15.75
Northern Coke Foundry, No. 1.....	14.00 to 14.50
Northern Coke Foundry, No. 2.....	13.50 to 14.00
Northern Coke Foundry, No. 3.....	13.00 to 13.50
Northern Scotch, No. 1.....	14.00 to 14.50
Ohio Strong Softeners, No. 1.....	14.80 to 15.05
Ohio Strong Softeners, No. 2.....	14.30 to 14.55
Southern Silvery, according to Silicon.....	14.15 to 15.15
Southern Coke, No. 1.....	to 13.65
Southern Coke, No. 2.....	to 13.15
Southern Coke, No. 3.....	to 12.90
Southern Coke, No. 4.....	to 12.65
Southern Coke, No. 1 Soft.....	to 13.65
Southern Coke, No. 2 Soft.....	to 13.15
Southern Gray Forge.....	to 12.65
Southern Mottled and White.....	to 12.15
Malleable Bessemer.....	13.50 to 14.00
Standard Bessemer.....	14.25 to 14.75
Jackson County and Kentucky Silvery, 6 to 10 per cent. Silicon.....	17.30 to 19.30
Alabama Basic.....	to 13.15
Virginia Basic.....	14.10 to 14.35

Billets.—A somewhat better demand for Billets exists than has been current for some time, but this demand is limited to immediate needs. The increased consumption simply means a betterment of manufacturing conditions in this territory. The official price of Forging and Rolling Billets, Open Hearth or Bessemer, is \$22.50 per gross ton, Chicago, with \$2 extra for Billets smaller than 4 x 4 and for Sheet Bars.

Rails and Track Supplies.—Steam roads are, of course, inactive in purchases of Standard Section Rails pending a possible change of prices some time this fall or winter, when the Rail pool holds its annual meeting. Two or possibly more lots of 2000 and 3000 tons of Standard Rails were ordered by new electric railway propositions. Light Rail business is improving somewhat, the demand coming from mines, lumber camps, irrigation projects and the like. Prices are from \$20 to \$22 per gross ton at mill. There is considerable demand for Spikes, Angle Bars and Track Bolts, Bars being quoted at from 1.30c. to 1.35c.; Spikes at from 1.60c. to 1.65c., in car lots; Track Bolts, 2.20c. to 2.25c., base, from mill, with Square Nuts, and 10c. to 15c. extra for Hexagon Nuts. Store prices on Angle Bars, Track Bolts and Spikes are about 15c. above mill prices.

Structural Material.—There are some interests who believe they see a slight improvement in the demand for Steel for buildings and bridges, but the stronger tone prevailing is more psychological than real as yet. Official prices are unchanged, as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.56½c.; Chicago; Angles, 3 to 6 inches, ¼-inch and heavier, 1.56½c.; Angles, larger than 6 inches on one or both legs, 1.66½c.; Beams, larger than 15 inches, 1.66½c.; Zees, 3 inches and over, 1.56½c.; Tees, 3 inches and over, 1.61½c., with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Store prices on Structural Materials are 1.80c. to 1.90c. for Angles, Beams, Channels and Zees, base sizes, with 1.90c. to 2c. for 18, 20 and 24 inch Beams; Tees, 1.85c. to 1.95c. These prices are for either random lengths or cut to lengths.

Plates.—The Plate business is small and the market is colorless. The tendency noted last week for buyers to cover more than immediate requirements has disappeared. The small independent mills, whose attitude is supposed to have influenced the \$4 cut in price, have pursued their original policy of shading prices and are now quoting at least 15c. per 100 lbs. below the new pool price on such sizes as they can handle. The prices on Plates are as follows: Tank quality, ¼-inch and heavier, wider than 24 and up to 100 inches wide, carloads, Chicago, 1.56½c.; 3-16 inch, 1.66½c.; Nos. 7 and 8 gauge, 1.71½c.; No. 9, 1.81½c.; Flange quality, and width up to 100 inches, 1.66½c.; Sketch Plates, in Tank quality, 1.66½c.; in Flange quality, 1.76½c. Store prices on Plates are as follows: Tank Plates, in widths up to 100 inches, ¼-inch and heavier, 1.75c. to 1.85c.; 3-16 inch, 1.85c. to 1.95c.; Nos. 8 and 10, 1.90c. to 2c.; Nos. 12 and 14, 2c. to 2.10c.; No. 16, 2.10c. to 2.20c.; Flange quality, 25c. per 100 lbs. extra.

Sheets.—Demand for Sheet Steel seems to be increasing, and some of the mills give it out that their capacity is

booked for 30 to 60 days ahead. This has, as a rule, reference particularly to certain sizes and gauges, as at the present rate of progress it will be a long time before the combined Sheet mills of this country will be unable to supply the demand for their products and do it promptly. Prices are unchanged, but weak, as follows, in carload lots: Nos. 9 and 10, 1.66½c.; Nos. 11 and 12, 1.71½c.; Nos. 13 and 14, 1.76½c.; Nos. 15 and 16, 1.86½c.; Nos. 18 to 20, 2.01½c.; Nos. 22 to 24, 2.06½c.; Nos. 25 and 26, 2.11½c.; No. 27, 2.16½c.; No. 28, 2.26½c.; No. 29, 2.36½c.; No. 30, 2.46½c. Store prices are nominally as follows, with slightly lower prices being named on some of the heavier gauges when occasion demands: Nos. 8 and 10, 1.90c. to 2c.; No. 12, 2c. to 2.10c.; No. 14, 2.05c. to 2.15c.; No. 15, 2.15c. to 2.25c.; No. 16, 2.20c. to 2.30c.; No. 18, 2.30c. to 2.40c.; No. 20, 2.30c. to 2.40c.; No. 22, 2.35c. to 2.45c.; No. 24, 2.40c. to 2.50c.; No. 26, 2.50c. to 2.60c.; No. 27, 2.60c. to 2.70c.; No. 28, 2.70c. to 2.80c.; No. 29, 2.85c. to 2.95c. Galvanized Sheets show no change since last week, being offered at from 80 and 7½ to 80 and 10 discount, Pittsburgh, carload lots and larger, and selling from store here at 75, 10 and 5 and 75, 10 and 7½ discount from list.

Bars.—The feeling in the Bar market is better than it was last week and specifications on contracts are much improved in volume. Indications are that users of Bars and Bands, notably the implement and wagon manufacturers, are running their shops almost full force and are eating up material at an encouraging rate. The settlement of the stockyards strike and the gradual improvement of the packing business to a point a little above the normal before the strike has favorably affected the Hoop business. The following are current prices: Soft Steel Bars and Bands, car lots, Chicago, 1.46½c., base, half extras; smaller lots, 1.51½c., with the usual extras for less than a ton of a size; Soft Steel Channels, Angles and Tees, Bar sizes, 1.56½c.; Soft Steel Hoops, 1.71½c. rates, full extras; Bar Iron, 1.35c. to 1.40c., base, half extras. Store prices on Soft Steel Bars, Bands, Angles, Channels and Tees are reduced 5c., in line with the reduction from the mill, making present store prices at Chicago warehouse: Soft Steel Bars and Bands, 1.65c. to 1.70c., base, half extras; Soft Steel Angles, Channels and Tees, 1.75c. to 1.80c., base, half extras; Iron Bars, 1.70c. to 1.75c., base, full extras; Steel Hoops, 2.10c. rates, full extras.

Merchant Steel.—There is a satisfactory increase in the variety and magnitude of specifications on the existing contracts, and quite a goodly number of new contracts are being effected. The outlook in this department of the Steel industry is more encouraging than it has been for several months. Prices are unchanged. We quote: Open Hearth Spring Steel to general trade, 1.85c. to 1.90c.; Smooth Finished Machinery Steel, 1.71½c. to 1.76½c.; Smooth Finished Tire, 1.66½c. to 1.71½c.; Flat Sleigh Shoe, 1.51½c. to 1.56½c.; Concave and Convex Sleigh Shoe, apparently unchanged at 1.66½c. to 1.71½c.; Cutter Shoe, apparently unchanged at 2.25c. to 2.30c.; Toe Calk Steel, 2.01½c. to 2.06½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots; Railway Spring, carload lots, 1.71½c. to 1.86½c., with reductions for larger quantities.

Merchant Pipe.—Business is not as good as it has been, and it is evident that the market has settled down to a condition where buyers are supplying only their actual current needs. Discounts are unchanged, as follows:

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
½ to ¾ inch.....	69.35	53.35	67.35	51.35
¾ and 1 inch.....	73.35	61.35	71.35	57.35
1 to 6 inches.....	77.35	67.35	75.35	63.35
7 to 12 inches.....	72.35	57.35	70.35	55.35

Boiler Tubes.—There is no change in either prices or situation in the Boiler market and business is slow. The following are discounts ordinarily quoted for less than car lots from mill for Chicago delivery. Prices are firm and unchanged, as follows:

	Steel	Iron	Seamless Steel
1 to 1½ inches.....	46.35	41.35	52.35
1½ to 2¼ inches.....	58.35	41.35	40.35
2¼ inches.....	60.35	46.35	43.35
2½ to 5 inches.....	66.35	53.35	up to 4 in. 50.85
6 to 13 inches.....	58.35	41.35	

Store business on Tubes is reported as showing some increase. The list of discounts named below are those that are nominally quoted for small lots from store, but better discounts are named to large buyers and on orders of considerable magnitude. These nominal warehouse prices for shipment from Chicago store in less than car lots are as follows:

	Steel	Iron	Seamless Steel
1 to 1½ inches.....	42½	37½	40
1½ to 2¼ inches.....	52½	35	37½
2¼ inches.....	55	37½	40
2½ to 5 inches.....	62½	47½	47½
6 inches and larger.....	52½	35	..

Cast Iron Pipe.—A scarcity of 4 and 6 inch sizes has developed, and mills are not promising to do better than November 15 delivery on these sizes. A multitude of small orders comes in every day, but no large lettings are imminent. Prices are firm, owing to the strength in Pig Iron and Coke, on the basis of \$25.50 for 4-inch Water Pipe, \$26.50 for 6-inch and heavier, and \$1 extra for Gas Pipe. These prices, however, will be shaded on very large lots.

Old Materials.—Contrary to the expectation of veterans in the business prices on Old Materials have stiffened considerably and strength is shown throughout the list. Consumers who have been holding off are coming into the market, tentatively it is true, but nevertheless they are coming in and buying in reasonable quantities. There is no railroad list of any consequence offered this week. The Northwestern Railroad secured good prices on its 1300 tons last week. The following prices represent about the range of dealers' buying and selling prices, the lower figures, as a rule, being those secured by railroads, although in some instances figures higher than the maximum were received by the Northwestern from buyers who had urgent need for the materials. We advance Old Iron Rails, 25c.; Old Car Wheels, 25c.; Heavy Melting Steel, 50c.; Iron Fish Plates, 25c.; Iron Car Axles, 75c.; Nos. 1 and 2 Railroad Wrought, 25c.; Wrought Pipe and Flues, 50c.; Mixed Borings, 50c.; No. 1 Dealers' Forge, 50c.; Railroad Malleable, 25c.; making the present list read as follows per gross ton:

Old Iron Rails.....	\$16.25 to \$16.50
Old Steel Rails, 4 feet and over.....	12.00 to 12.25
Old Steel Rails, less than 4 feet.....	11.00 to 11.25
Heavy Relaying Rails, subject to inspection.....	20.50 to 21.50
Heavy Relaying Rails, for side tracks.....	18.00 to 20.00
Old Car Wheels.....	11.25 to 11.75
Heavy Melting Steel Scrap.....	10.50 to 11.00
Mixed Steel.....	8.50 to 9.00

The following quotations are per net ton:

Iron Fish Plates.....	\$13.25 to \$13.75
Iron Car Axles.....	17.00 to 17.50
Steel Car Axles.....	14.50 to 15.00
No. 1 Railroad Wrought.....	12.00 to 12.50
No. 2 Railroad Wrought.....	11.00 to 11.50
Shafting.....	12.50 to 13.00
No. 1 Dealers' Forge.....	8.50 to 9.00
Wrought Pipes and Flues.....	8.50 to 9.00
Iron Axle Turnings.....	7.25 to 7.75
Soft Steel Axle Turnings.....	7.25 to 7.75
Machine Shop Turnings.....	7.00 to 7.50
Cast Borings.....	4.50 to 5.00
Mixed Borings, &c.....	4.50 to 5.00
No. 1 Mill.....	7.00 to 7.50
Country Sheet.....	5.00 to 5.50
No. 1 Rollers, cut to Sheets and Rings.....	8.00 to 8.50
No. 1 Cast Scrap.....	10.50 to 11.00
Stove Plate and Light Cast Scrap.....	9.00 to 9.50
Railroad Malleable.....	9.25 to 9.75
Agricultural Malleable.....	9.00 to 9.50

Metals.—Business is extremely quiet, and prices are unchanged, as follows: Spelter is quoted at 5c. to 5½c. for car lots, and 5.25c. to 5½c. for small lots. Casting Copper is being held at 12½c. and Lake at 13c. Pig Tin is now quoted at 29c. to 29½c. Pig Lead is now quoted at 4.20c. for 50-ton lots, 4.30c. for car lots and 4.40c. to 4.50c. for less than car lots. Sheet Zinc is 6½c. for car lots of 600-lb. casks and 6¾c. for less than car lots. We quote Old Metals as follows: Copper Wire and Heavy, 11¼c. to 11½c.; Copper Bottoms, 10c.; Copper Clips, 11c. to 11½c.; Red Brass, 9¾c.; Red Brass Borings, 8c.; Yellow Brass, Heavy, 7¾c.; Yellow Brass Borings, 6½c.; Light Brass, 5¾c.; Tea Lead, 4c.; Zinc, 4.25c.; Pewter, No. 1, 17½c.; Block Tin Pipe, 22½c.

Coke.—There is no doubt that the Coke market shares the strength of the Iron market, buyers already opening up negotiations with sellers with a view to supplying their requirements for 1905. Few deals of this kind have been closed, because the views of buyers and sellers are too wide apart, but the effort on the part of melters to cover is considered a good omen. Connellsville Foundry Coke ranges from \$1.85 to \$2.10, the higher price being that secured for brands whose names usually command a premium. Virginia and West Virginia ovens, including Wise County, are selling at from \$1.75 to \$1.90, the freight of the latter being \$2.25 a ton to Chicago, as against \$2.65 from other Coke districts in Virginia, West Virginia and Pennsylvania.

Philadelphia.

FORREST BUILDING, October 4, 1904.

Whatever may be the final outcome, the immediate feeling in Iron and Steel is undoubtedly better than it has been for months past. The greatest strength is in Pig Iron, which is well sold up and is inquired for in considerable quantities. Sales have also been on a liberal scale, so that for the present sellers appear to be in full control. Whether these combined influences will lead to better prices or not remains to be seen, but, as we said before, the immediate situation is quite strong. Reports in regard to Finished Material are of a less confident character, although prices are steadier than they have been for months past, besides which the volume of business shows a gratifying increase. It should not be assumed, however, that the long looked for and often predicted improvement in business is to be followed at once by other reports of still further improvement. It

may be so, of course, and it is impossible that any one could wish it to be otherwise, but it would do more harm than good to mistake the signs of the times. As regards Pig Iron, there are special reasons for its strength. In the first place, prices are so close to actual cost that producers would cease operations rather than sell Iron at a loss. In the next place, the supply is barely large enough to meet current requirements, besides which costs are more likely to increase than to decrease, so that while these conditions prevail prices are not likely to go lower. The probability of a resumption of output by the Alabama furnaces, however, must not be overlooked, in which event the outlook will be materially changed. The price to-day is said to be \$9.50, at furnace, firm; but with six or eight more large furnaces in operation it is quite possible that \$9 or \$9.25 would again become an open quotation for No. 2 X Foundry Iron. If the strike is settled (as now seems probable) in favor of the operators, they will become free sellers of Iron at \$9.50, if possible, or at a lower figure down to \$9 in case competition requires them to meet that figure, so that while the immediate outlook is good, there are elements of uncertainty which ought not to be overlooked. Nevertheless the opening week in the last quarter of rather a poor year is the most cheerful that has been seen for a long time, and while there are no expectations of material improvement this year, it certainly gives some assurance that low water mark has been reached and that in due season improvement will be a very distinct feature.

Pig Iron.—There is a strong tone in the Pig Iron market, although there are free sellers at quoted rates. It is a little curious that the local demand is slow and unsympathetic, while reports from other districts are almost universally favorable. The New England demand is particularly good, and Irons that not long ago were \$1 or more per ton too high for that market are now taken without much hesitation. The scarcity of Southern Iron may be an explanation for the change of feeling, but, apart from that, advices are much better than they have been at any previous time this year. Special Irons are showing more activity, and are usually quoted at somewhat better prices. Basic Iron has sold at \$12.75, and Low Phosphorus is very firm; in some cases more than \$18 is asked, although business has been done at \$18. Foundry grades, without being higher, are certainly very firm, and the average of sales would probably equal the average of quotations. Mill Irons are firmer, and average an advance on last week's prices, but they are not quotably dearer. The demand for Muck Bars and for Cast Iron Pipe is quite heavy, so that low priced Irons are finding a comparatively ready market, and may sell a trifle higher unless the supply becomes larger. Taking everything into consideration, the Pig Iron end of the market looks well, although there is no expectation that prices will be more than fractionally higher, and even that is open to question. For the present the following figures are a fair average for Philadelphia and nearby deliveries:

No. 1 X Foundry.....	\$15.00 to \$15.25
No. 2 X Foundry.....	14.25 to 14.50
No. 2 Plain.....	13.50 to 13.75
Standard Gray Forge.....	12.75 to 13.00
Ordinary Gray Forge.....	12.25 to 12.50
Southern No. 2 X Forge, rail.....	13.75 to 14.00
Basic.....	12.75 to 12.85
Low Phosphorus.....	17.75 to 18.25
Malleable Iron.....	14.50 to 14.75

Steel.—The demand is considerably better than for some time past, consumers' requirements being urgent in most cases. Prices vary from a fraction less than \$22 for good sized lots, up to \$22.25 for smaller quantities. There is rather a strong undertone, and it is believed that rock bottom has been reached for this class of material.

Plates.—Continued improvement is noted in the Plate trade, very considerable additions to order books having been made during the past week. The demand is of a well distributed character and includes all descriptions of material, but specially for Tank and Boiler purposes. Prices unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel, rectangular Plates, 24 inches wide and under.....	1.43½	1.48½
Tank, Bridge and Boat Steel, over 24 inches wide.....	1.53½	1.58½
Flange or Boiler Steel.....	1.63½	1.68½
Marine, A. B. M. A. and Commercial Fire Box Steel.....	1.73½	1.78½
Still Bottom Steel.....	1.83½	1.88½
Locomotive Fire Box Steel.....	2.03½	2.08½
The above are base prices for ¼-inch and heavier. The following extras apply:		
3-16 inch thick.....	\$0.10 per lb. extra.	
Nos. 7 and 8 W. G.....	.15	"
No. 9 W. G.....	.25	"
Plates over 100 to 110 inches.....	.05	"
Plates over 110 to 115 inches.....	.10	"
Plates over 115 to 120 inches.....	.15	"
Plates over 120 to 125 inches.....	.25	"
Plates over 125 to 130 inches.....	.50	"
Plates over 130 inches.....	1.00	"
All sketches (excepting straight taper plates, varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches).....	.10	"
Complete Circles.....	.20	"
All the above f.o.b. Philadelphia.		

Structural Material.—The demand is a trifle better, although there is nothing beyond the ordinary run of business. Mills have a good deal of work on their books, however, and are therefore enabled to run comfortably full. Prices are steady as last quoted—viz., Beams, Channels and Angles, 1.53½c. to 1.65c., according to specifications, and small Angles, 1.50c. to 1.55c.

Bars.—The demand for Bars is not particularly good, and buyers claim that they can do better than the association prices. This cannot be authenticated, but first-class mills claim that they lose business, which they have reason to think is taken at cut prices; but there is a heavy demand for Skelp, so that, on the whole, mills are well employed. Prices for either Iron or Steel Bars in carload lots 1.43½c., part carloads at the usual advance.

Sheets.—Better demand but at irregular prices. Mills, in most cases, are running full, but they have very little work ahead, and have to depend on the day to day demand.

Old Material.—Scrap Material is very firm, although buyers offer strong resistance because of the low prices for Finished Material. Holders appear to have the strongest end of the market at the present time, however, and are disposed to hold for the full limit. Bids and offers for deliveries in buyers' yards are about as follows:

No. 1 Steel Scrap.....	\$12.25 to \$12.50
Old Steel Axles.....	15.50 to 16.00
Old Iron Axles.....	18.50 to 19.50
Old Iron Rails.....	15.50 to 16.00
Old Car Wheels.....	12.00 to 12.50
Choice Scrap, R. R. No. 1 Wrought.....	15.00 to 15.50
Machinery Scrap.....	12.00 to 12.50
Low Phosphorus Scrap.....	16.50 to 17.00
Wrought Iron Pipe.....	11.25 to 11.75
No. 1 Forge Fire Scrap.....	10.00 to 10.50
No. 2 Forge Fire Scrap, Ordinary.....	8.00 to 8.50
Wrought Turnings.....	9.00 to 9.25
Wrought Turnings, Choice Heavy.....	10.00 to 10.50
Cast Borings.....	6.95 to 7.15
Stove Plates.....	9.50 to 10.00

Cincinnati.

FIFTH AND MAIN STS., October 5, 1904.—(By Telegraph.)

Pig Iron.—The week just ended has been a fairly satisfactory one. In a general way the market has shown considerable strength, and is quite active. From what we can gather there has been no Northern Iron sold at a less figure than \$11.50, furnace, and no Southern Iron below \$9.25, Birmingham. These quotations probably represent the minimum prices of both the Northern and Southern production, and there seems to be no doubt that the tonnage offering at these figures is rapidly growing less. It looks as though the Southern producers were showing somewhat of an independent attitude, having disposed of about all the Iron they produced. In any event they absolutely refuse to quote into next year, apparently hoping for a stiff advance in prices. Reports show considerable shortage in both Northern and Southern territory, and several agents are said to have declined sales on this account. The Tennessee Company is said to have blown in two more stacks and may possibly add another this week. Gray Forge and High Silicon are both reported to be difficult to procure, as there is a very limited stock on hand. Inquiries for next year's delivery are coming in quite freely, but conditions are such they cannot be satisfactorily handled. There is a call from Detroit for 2000 tons of Southern Foundry No. 3, delivery to be made this year; another from the same point for 1500 tons for the first half next year's delivery; 8000 tons from a Central Ohio concern for forward delivery; an inquiry from Louisville for 2000 tons for delivery during the next eight months, beginning with November; one from Northern Ohio for 1500 tons, seven months delivery, beginning with December, and one from Indianapolis for 2000 tons for eight months delivery, commencing with November. There have been numerous sales made in quantities ranging from 100 to 500 ton lots, and three sales aggregating 3200 tons, delivery to be made this year. Several good sales of Malleable and Basic are reported from the Pittsburgh and Cleveland districts. There is apparently little change in the local situation. The foundries not affected by the strike seem to have plenty of work, and the others are fast getting into shape, importing men from the outside. Freight rates from Hanging Rock district to Cincinnati, \$1.15, and from Birmingham, \$2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$12.50 to \$12.75
Southern Coke, No. 2.....	12.00 to 12.25
Southern Coke, No. 3.....	11.50 to 11.75
Southern Coke, No. 4.....	11.25 to 11.50
Southern Coke, No. 1 Soft.....	12.50 to 12.75
Southern Coke, No. 2 Soft.....	12.00 to 12.25
Southern Coke, Gray Forge.....	11.00 to 11.25
Southern Coke, Mottled.....	10.75 to 11.00
Ohio Silvery, No. 1.....	15.65 to 16.15
Lake Superior Coke, No. 1.....	13.15 to 13.65
Lake Superior Coke, No. 2.....	12.65 to 13.15
Lake Superior Coke, No. 3.....	12.15 to 12.65

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$16.25 to \$16.75
Lake Superior Car Wheel and Malleable	15.80 to 16.30

Coke.—The market for this commodity looks better, and demand is on the increase. The demand in the South for the Virginia product is apparently decreasing, as the furnaces in that territory show increased production. It is reported that there are labor difficulties among the Virginia miners, which will tend to lessen the supply. We quote the best grades of Connellsville from \$1.85 to \$2.15, f.o.b. ovens.

Plates and Bars.—There is shown to be a steady demand for Finished Material, but there have been no sales of any considerable tonnage reported. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.50c., with half extras; the same in smaller lots, 1.70c., with full extras; Steel Bars, in carload lots, 1.43c., with half extras; the same in smaller lots, 1.65c., with full extras; Base Angles, 1.53c. in carload lots; Beams and Channels, in carload lots, 1.53c.; Plates, ¼-inch and heavier, 1.53c., in carload lots; in smaller lots, 1.80c.; Sheets, 16-gauge, in carload lots, 2.05c.; smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, ¾ x 3-16 and heavier, 1.63c., in carload lots.

Old Material.—There are no new developments along this line, a fair normal condition prevails, and there are evidences of a healthful state of affairs. Prices as far as can be ascertained are unchanged. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, \$10.50 to \$11.50 per net ton; No. 1 Cast Scrap, \$10 to \$10.50 per net ton; Iron Rails, \$14 to \$14.50 per gross ton; Steel Rails, rolling lengths, \$10 to \$11 per gross ton; Relaying Rails, \$18 to \$19 per gross ton; Iron Axles, \$14 to \$15 per net ton; Car Wheels, \$10 to \$10.50 per gross ton; Heavy Melting Scrap, \$9.50 to \$10.50 per gross ton; Low Phosphorus Scrap, \$11.50 to \$12 per gross ton.

Birmingham.

(By Telegraph.)

BIRMINGHAM, ALA., October 5, 1904.

As forecasted in my last letter, a material increase in inquiry has occurred, followed by a largely increased demand at enhanced values. The demand is not localized, but is general, covering all buying districts. Some sales were made on the basis of \$9.50 for No. 2 Foundry, but the large demand quickly sprung it to \$10, and at that price there is very little, if any, to be had. Your correspondent knows of numbers of orders declined because of sheer inability to furnish the Iron. One leading interest in the past few days has declined orders whose aggregate footed up fully 100,000 tons, and their agents are enjoined to accept no business not authorized by the Birmingham office. All sales must pass the scrutiny of the furnace office before confirmation. There seems to be developing a buying wave which finds but little Iron to engulf. Demand for Warrant Iron has developed to good proportions on basis of \$9.50 for No. 2 Foundry, but there are more buyers than sellers, and the tendency of price is upward. Some No. 1 Soft as well as No. 1 Foundry sold at \$10.50 to the amount of 1500 tons. No. 3 Foundry sold at \$9.50, with a demand our available supply could not satisfy. Some Pipe works gobbled up early what they could get and skinned the market bare before their competitors acted. No. 4 Foundry sold at \$9, as well as Gray Forge. The sales could have been largely increased had there been Iron that could have been used for delivery.

As to the differences between the miners and operators, both sides claim advantages gained, but there is no question that the operators' forces are constantly increasing in a ratio equal to ability to provide for them. It is a generally accepted fact that the miners have lost their fight and the operators are in the saddle.

The largest single order in the past few days was for 30,000 tons, which was cut down to 9000 tons and accepted. There was another in to-day for 4000 tons, and after cutting it down to 1000 tons it was accepted. This attests the character of the buying. There has been a deluge of small and medium orders on a basis of \$10 for No. 2 Foundry which has not yet subsided.

The Nittany Iron Company, Bellefonte, Pa., has recently been reorganized, the former officers retiring. Noah H. Swayne, 2nd, president of the Alabama & Georgia Iron Company, Cedartown, Ga., has been elected president and has assumed the active management. The Nittany furnace, which was banked during July and August, was started again on August 27. The output of iron has been largely increased, all previous records having been surpassed. The company make a specialty of soft foundry pig iron.

The National Founders' Association will hold its annual meeting at the Grand Hotel, Cincinnati, on November 16 and 17.

Pittsburgh.

PARK BUILDING, October 5, 1904.—(By Telegraph.)

Pig Iron.—The Pig Iron market has a decidedly healthy tone, and while actual tonnage being sold is not as large as it was two weeks ago, yet this is only a natural reaction from former activity in buying. Prices of Pig Iron are decidedly firm, and consumers are willing to buy now for the balance of this year and into the first part of next year at figures that a month ago they would have turned down. The Westinghouse Air Brake Company has bought upward of 10,000 tons of Foundry and Forge Iron, covering its requirements for some months ahead. The minimum price of Standard Bessemer and Chilled Basic Iron for balance of this year delivery or into January and February is \$12, at Valley furnace, or \$12.85, Pittsburgh. Firm offers of \$11.75 to \$11.85, at furnace, for these deliveries have been turned down by the furnaces. The heavy sales of Foundry Iron to the Westinghouse Electric and the Standard Sanitary Mfg. companies two weeks ago, followed by the recent large purchase of the Westinghouse Air Brake Company, have firmed up the Foundry Iron market and \$12, at Valley furnace, for rest of the year delivery is now being generally quoted. It is possible that small lots of No. 2 Foundry for prompt shipment might be picked up at about \$11.90, at furnace, but the available tonnage of such Iron is very small. There is a good deal of inquiry for Forge, and Northern brands are held firmly at \$12, Pittsburgh. We quote Standard Bessemer and Chilled Basic Iron, also Northern No. 2 Foundry, at \$12, Valley, or \$12.85, Pittsburgh. We quote Northern Forge Iron at \$12 to \$12.10, Pittsburgh, and note a sale of 2000 tons at the first named price.

Steel.—We are advised that official prices on Billets and Sheet Bars are being firmly held and all the mills have a good deal of tonnage on their books. Some good sized inquiries are being figured on and the Steel market is in more satisfactory shape both as regards tonnage and the maintenance of prices than for some time. We quote Bessemer and Open Hearth Billets up to 0.25 carbon at \$19.50, Sheet and Tin Bars, long lengths, \$21.50, f.o.b. Pittsburgh district, to which freight to destination should be added.

(By Mail.)

An encouraging development in the situation in the Iron trade is the entrance of the Pennsylvania Railroad into the market in the last few days as a buyer of Steel cars, this road having placed an order for 300 Steel hopper coal cars with the Pressed Steel Car Company of this city and for an equal number with the Cambria Steel Company of Johnstown, Pa. This road will also build 25 powerful freight engines at the Altoona shops, to be used on the lines west of Pittsburgh, and also 80 passenger cars. The road is in the market for 200 Coke cars, which will be placed shortly, and all this means a good deal of tonnage in Steel Plates, Bars, Tubes and other Shapes. Should other railroads follow the example of the Pennsylvania it would be only a short time until there would be more activity in the Iron trade. We can also state that the Baltimore & Ohio Railroad placed an order last week for 14,000 tons of Steel Rails, the business going to a local mill. For the past year the railroads have been very small purchasers of Iron and Steel materials, and it is certain that the equipment of many of the roads is very much run down and must soon be replaced.

General conditions in the Iron trade are about the same as noted in this report last week. Consumers of Pig Iron are in the market with large inquiries for delivery into next year, but so far furnaces do not seem disposed to sell beyond January or February at present prices. It is figured out that prices of Pig Iron cannot well go any lower, and any change must be in the direction of higher values. The furnaces in the Bessemer Furnace Association are reported as holding Bessemer and Chilled Basic Iron very firmly at \$12 at furnace, or \$12.85, Pittsburgh, for delivery in the next three or four months. It is probable that for October and November shipment small lots of Bessemer and Basic Iron might be picked up at about \$11.85, Valley furnace, but this would seem to be the bottom of the market. There have been no large purchases of Foundry Iron since our last report, and Northern makes of No. 2 are held at \$11.85 to \$12 at Valley furnace, or \$12.70 to \$12.85, Pittsburgh. Very little Southern Foundry is coming into this market, as the price is nearly \$1 a ton higher than Northern Iron. There is some demand for Forge Iron, which is held at \$11.85 to \$12, Pittsburgh, for Northern brands. Tonnage in Finished Iron and Steel is slowly improving, specifications on contracts coming in more freely, while new tonnage is a little larger. As yet consumers do not seem disposed to contract very far ahead at present prices unless such contracts are guaranteed against decline. Orders being placed usually call for prompt shipment, and this indicates that stocks in job-

bers' and consumers' hands are very light. There have been no important changes in prices.

Ferromanganese.—We do not hear of any large sales and continue to quote foreign and domestic 80 per cent. Ferro at \$41, delivered, for large lots.

Muck Bar.—A sale of 250 tons of local Muck Bar is reported at \$24, delivered at buyer's mill, Pittsburgh. Some brands of Bar, not made from strictly all Pig Iron, are offered at lower prices.

Rods.—Not enough tonnage is being placed in Rods to test the market. We quote Bessemer and Open Hearth Rods at \$26, Pittsburgh, but this price would be shaded on a firm offer.

Skelp.—The Skelp trade continues fairly active, and several good sized sales of Grooved and Sheared Iron Skelp have been made in this market in the last few days. We quote Grooved Iron Skelp at 1.40c., Sheared Iron Skelp, ordinary width and gauges, at 1.45c., while for narrow sizes and light gauges Sheared Iron Skelp has sold as high as 1.55c. Grooved Steel Skelp is held at 1.30c. and Sheared at 1.35c. to 1.40c.; all these prices are f.o.b. cars delivered to mills in the Pittsburgh district.

Steel Rails.—Last week the Baltimore & Ohio Railroad placed an order for 14,000 tons of Steel Rails, the business going to a local interest. Light Rails continue low in price, and are selling at \$18.50 to \$21, depending on weight.

Structural Material.—The Wabash contract for 4000 tons of Structural Steel for a freight depot to be built in this city has not yet been placed, but will likely be given out this week. The tonnage is likely to be divided between the two local interests. Some large jobs are coming up, particularly in railroad work, and the outlook is better than for some time. However, a good deal of contemplated work has gone over until next year. We quote: Beams and Channels, up to 15-inch, 1.40c.; over 15-inch, 1.50c.; Angles, 3 x 2 x 1/4 inch thick up to 6 x 6 inches, 1.40c.; Angles, 8 x 8 and 7 x 3 1/2 inches, 1.50c.; Tees, 3-inch and larger, 1.40c.; Tees, 3-inch and larger, 1.45c. Under the Steel Bar Card, Angles, Channels and Tees under 3-inch are 1.40c., base, for Bessemer and 1.45c., base, for Open Hearth, subject to half extras on the Standard Steel Bar Card.

Plates.—The contract for 600 Steel hopper cars just placed by the Pennsylvania Railroad and equally divided between the Pressed Steel Car Company and the Cambria Steel Company, will require nearly 7000 tons of Plates and other small shapes. The Plate trade is better in demand, consumers placing orders more freely and for larger tonnage than for some time past. It is understood that on contracts for extended delivery prices are guaranteed against decline.

	Per pound extra.
Gauges lighter than 1/4-inch to and including 3-16-inch Plates on thin edges.....	\$0.10
Gauges No. 7 and No. 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 inches.....	.05
Plates over 110 to 115 inches.....	.10
Plates over 115 to 120 inches.....	.15
Plates over 120 to 125 inches.....	.25
Plates over 125 to 130 inches.....	.50
Plates over 130 inches.....	1.00
All sketches (excepting straight taper Plates, varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
Marine, "A. B. M. A." and ordinary Fire Box Steel Plates.....	.20
Still Bottom Steel.....	.30
Locomotive Fire Box Steel.....	.50
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum, and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of 1/2 of 1 per cent. is allowable. Pacific Coast not included.

Sheets.—A fairly large volume of business is being placed in Sheets, but it is mostly in small lots and for early shipment. Consumers do not seem disposed to contract ahead, as the recent reduction in price of Sheet Bars has unsettled prices of Sheets to slight extent, but which as yet are not any lower. We quote No. 26 Black Sheets, box annealed, one pass through cold rolls, at 1.95c.; No. 27, 2c.; No. 28, 2.10c., in carloads and larger lots. Galvanized Sheets are sold at about 80 and 7 1/2 per cent. off, but on very desirable specifications a few mills occasionally name 80 and 10 per cent. off in large lots. We quote Galvanized Sheets as follows: Nos. 22 and 24, 2.59c.; Nos. 25 and 26, 2.77c.; No. 27, 2.96c., and No. 28, 3.14c. Jobbers charge the usual advance over these prices on small lots from store.

Iron and Steel Bars.—Some good sized inquiries are in the market for Steel Bars, one of 5000 tons from a leading agricultural implement interest. Actual tonnage coming into the mills is a little larger, but there is room for considerable improvement yet. We quote Bessemer Steel Bars at 1.30c., base; Open Hearth Bars at 1.35c., base, with the usual differentials for small lots. We quote Refined Iron Bars at 1.30c., f.o.b. Pittsburgh.

Railroad Spikes.—Demand is rather quiet and prices in some sections are unsettled. Local concerns quote \$1.55 per 100 lbs. in carload lots and \$1.60 in less than carload lots, f.o.b. Pittsburgh.

Hoops and Bands.—A moderate tonnage is being placed in Hoops and Bands. We quote Bands at 1.30c., extras as per Steel card, and Steel Hoops at 1.55c., in carloads. We understand our price on Hoops is being shaded.

Merchant Pipe.—As yet nothing has been done on the inquiry of the Ontario Pipe Line Company for 110 miles of Line Pipe, and it is not known now whether this business will be placed. Tonnage in Merchant Pipe is quite satisfactory, considering the season of the year, and the tone of the market is fairly strong. Discounts to consumers are as follows:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Per cent. Per cent. Per cent. Per cent.				
1/2 and 3/4 inch.....	71	55	69	53
3/4 and 1 inch.....	75	63	73	61
1 to 6 inches.....	79	69	77 1/2	67 1/2
7 to 12 inches.....	74	59	72 1/2	57
Extra strong, plain ends,				
1/2 to 3/4 inch.....	64	52	62	50
3/4 to 1 inch.....	71	59	69	57
1 to 6 inches.....	67	55	65	53
Double extra strong,				
plain ends, 1/2 to 3/4	60	49	58	47
inches.....				

Boiler Tubes.—Demand for Boiler Tubes is picking up a little, railroads buying more liberally than for some time. Discounts to consumers in small lots are as follows:

	Steel.	Iron.
1 to 1 1/4 inches.....	48	43
1 1/4 to 2 1/4 inches.....	60	43
2 1/4 to 3 inches.....	62	48
3 to 5 inches.....	68	55
6 to 13 inches.....	60	43

Merchant Steel.—The Crucible Steel Company, which is the leading producer, states that its tonnage in September was 20 per cent. larger than in August. There is a better inquiry for Agricultural Steel, and consumers are showing more disposition to place orders and also to make contracts. We quote: Tire Steel, 1.50c.; Sleigh Shoe, flat, 1.40c.; Cutter Shoes, tapered and bent, 1.90c. to 2c.; Open Hearth Spring Steel, 1.85c. to 2c., depending on order. Crucible Tool Steel ranges from 5 1/2c. to 7c. for ordinary grades and 8c. to 15c. for best grades. Cold Rolled Shafting is firmer at 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory.

Spelter.—Demand is very dull, but prices are fairly firm. Prime grades of Western Spelter are held at 5.03 1/4c. to 5.08 1/4c., Pittsburgh.

Tin Plate.—New demand for Tin Plate is very dull, the mills running mostly on contracts. Claims are made that the official prices on Tin Plates are being shaded by some of the outside mills, but this is denied. We quote 100-lb. Cokes at \$3.25, net, f.o.b. Pittsburgh district, terms 30 days, or 2 per cent. off for cash in 10 days.

Connellsville Coke.—As yet very little has been done in the matter of making contracts for Furnace or Foundry Coke for next year. Consumers are offering to contract for first six months of the year and also for the entire year at present prices, but producers do not seem disposed to make such contracts, arguing that prices of Coke have been too low for some time and they are not disposed to tie up their product for next year at figures that are being paid for Coke for prompt shipment. Strictly Connellsville Furnace Coke is being offered for shipment through balance of this year at \$1.45 to \$1.50 a ton, but some producers are holding their Coke for \$1.60 a ton. Strictly Connellsville 72-hour Foundry Coke is held at \$1.80 to \$2, some concerns refusing to sell at less than the higher price. Main Line Furnace Coke is selling at \$1.35 to \$1.40 a ton and Foundry at \$1.55 to \$1.65 a ton. Output of Coke is steadily increasing, the estimated output of the Upper and Lower Connellsville regions having been 215,000 tons.

Iron and Steel Scrap.—The market on Old Material is showing some improvement in demand and prices are very firm, dealers quoting about 50c. a ton higher for all kinds of Scrap than a week ago. We quote Heavy Melting Scrap at \$12; No. 1 Wrought Scrap, \$12.50; Bundled Sheet Scrap, \$9.50 to \$10; Cast Iron Borings, \$6.75 to \$7; Wrought Turnings, \$9.50 to \$9.75; Old Rails, long pieces, \$13; short pieces, \$11.50 to \$12; Iron Car Axles, \$18.25 to \$18.50, all in gross tons. We note a sale of about 400 tons of Bundled Sheet Scrap at a price equal to about \$10, Pittsburgh.

Joseph Glover, formerly assistant superintendent of the 10 and 23 inch plate mills at the Homestead Steel Works of the Carnegie Steel Company, has resigned to accept an important position with the Lackawanna Steel Company, at Buffalo, N. Y.

Cleveland.

CLEVELAND, OHIO, October 4, 1904.

Iron Ore.—A spurt was started in shipments down the lakes, which is intended to lessen the surplus amount yet to be shipped and to catch up, if possible, with the amount which ought to have been shipped up to this time, but which the producers were prevented from doing by divers circumstances. This increase in the movement has resulted in an advance in rates of 5c. a ton all round. The head of the lakes rate is now 70c., and Marquette 65c., while Escanaba is bringing 55c. The vessel situation is also strengthened by the dock situation. Ore docks are crowded, and the ore must be moved immediately to the furnaces. The greater activity in Ore movement has not resulted in any material increase in sales.

Pig Iron.—In Foundry Iron much of the appearance of strength which was recently displayed has disappeared and the market is turning somewhat softer again. There are no signs of contraction on the part of the foundries in their specifications or in their melt. They are simply satisfied with what they have already ordered and are not sanguine enough of the future to buy more. In many instances the prices recently quoted as bottom are now quoted as the top. Buyers here are getting a good deal of Iron at \$11.75, in the Valleys, and are paying \$12 only when there is an absolute necessity to do so. The furnaces which are trying to get \$12.25 are out of the market. Very little is being done in Bessemer. The Bessemer Association has no orders under contemplation. The market is about \$12, in the Valleys. In Coke a little more strength is seen, due to some better buying by the foundries. For the most part, however, the buying has been so heavy here of late that there is very little contracting yet to be done. Prices of Coke are unchanged. Pig Iron prices are slightly revised and quoted, f.o.b. cars Cleveland, as follows:

Northern Coke, No. 1 Foundry.....	\$13.10 to \$13.35
Northern Coke, No. 2 Foundry.....	12.60 to 12.85
Northern Coke, No. 3 Foundry.....	12.10 to 12.35
Southern Coke, No. 1 Foundry.....	13.85 to 14.10
Southern Coke, No. 2 Foundry.....	13.35 to 13.60
Southern Coke, No. 1 Soft.....	13.85 to 14.10
Southern Coke, No. 2 Soft.....	13.35 to 13.60

Finished Iron and Steel.—A little better buying of Plates has come in part from the shipbuilding industry and in part from the boilermakers, who are showing some signs of improvement. It is evident that a good deal of the buying has come from industries which awaited a drop in prices. The outlook for a good run of new business is much improved. Some new ship orders have but recently been placed, and the aggregate tonnage demanded will be considerable. A slight improvement is also seen in the demand for Structural Shapes. This arises partly from the shipbuilding industry and partly from some increased activity in the building trade. One thing, however, is still evident: The contractors are not specifying very heavily against their purchases. The recent cut in the price of Bar Steel did not bring out much business. On the other hand, there is a fair demand for Bar Iron. One big producer is holding for 1.35c., at the mill, but not getting any business. Others ask 1.30c., and are shading from that according to the strength of the competition. It is said that 1.25c. is about the market. The Sheet situation is stronger. The buying last week was tremendous and entirely satisfactory to all concerned. This sort of buying has lasted now about ten days or two weeks. It is intimated, too, that the cut in the price of Billets brought out heavy orders. The market has been better during the past week than at any time for weeks previous. It is possible that much of this buying was held over, having been accumulating.

Old Material.—The market is getting stronger all the time. Buyers are taking material spasmodically, but prices are working higher. For the time being buyers have been able to stave off the advance. We quote, all gross tons: Old Steel Rails, \$12; Old Car Wheels, \$12; Heavy Melting Steel, \$12. All net tons: Cast Borings, \$4.50; No. 1 Busheling, \$10.50; No. 1 Railroad Wrought, \$12 to \$12.50; Wrought Turnings, \$7; Iron Car Axles, \$16 to \$17; No. 1 Cast, \$10.50 to \$11; Stove Plate, \$7 to \$7.50.

Extensive water concessions are held in the State of Jalisco, Mexico, by Manuel Cuevas, who is making arrangements to begin construction work. The concessions permit of the utilization of water from Lake Chapala sufficient to irrigate 300,000 acres of land, and from the Santiago River between the Juanacatlan Falls and Poncitlan. The concessionaire proposes to build canals from the lake to the river in a northerly direction, and to use pumps at the lake in order to raise the water to the canals. The pumps are to be electrically operated, power being supplied from a plant to be built on the Santiago River.

Chicago Machinery Market.

CHICAGO, October 1, 1904.

A decidedly better feeling is manifested in the machinery world. Dealers and manufacturers carrying machines in stock find that their ability to make immediate shipment is being taken advantage of by a large variety of interests. In other words, much of the present machinery demand is for immediate shipment, as buyers have evidently put off the purchases of their machines so long that they cannot wait for mill delays. Another consequence of this urgent demand is an increasingly large call for second-hand equipments from stock. There is no one line of trade, nor one geographical territory that stands out above others in the improved demand for machinery, but this quickening in the machinery trade is general both as to location and craft. Complaint is made by machinery manufacturers and dealers, however, that present prices are too low from the standpoint of the producer, and it is generally felt that if the present demand continues prices will stiffen considerably. Railroads, as a rule, are inconspicuous buyers, but it is known that their requirements are piling up, and felt that when they do enter the market they will have to pay higher prices than are now ruling for their requirements, and that they will have some difficulty in securing early deliveries. There is a demand for heavy second-hand machinery, which cannot be supplied from existing stocks.

The city of Chicago, as previously reported, has issued specifications for furnishing and erecting two vertical, triple expansion pumping engines, having a capacity of 40,000,000 gallons per day against a normal head of 120 feet. One of these engines is to go into the Central Park avenue station and one into the Springfield avenue pumping station. The same advertisement calls for two feed water heaters and purifiers of the open type with oil separator, each to be of a capacity to hold 40,000 pounds of feed water per hour. It also provides for air pumps of the independent or connected type, and an independent feed pump for each engine having a normal capacity of not less than 65 gallons per minute and capable of working against a pressure of 200 pounds per square inch. Bids will close on these engines November 17. The city of Chicago will also advertise shortly for one compound horizontal pumping engine of 20,000,000 gallons capacity for the Sixteenth street pumping station, and for four 250 horse-power Scotch boilers for the Lake View pumping station, with automatic stokers, the type of stokers not being specified. The award on the turbine plant for the drainage district has been delayed, and will not be officially closed until October 5. The Allis-Chalmers Company secured the contract for the pumps for the Thirty-ninth street sewerage pumping station a long time ago, as published in these columns, but the engines and boilers have not yet been let. Three 150 horse-power tubular boilers for the Fullerton avenue pumping station have not yet been officially awarded, but Kroeschell Brothers, Chicago, are stated to be the lowest bidders. The condensing apparatus for the new Fullerton avenue electrical station was awarded to Baragawanath & Sons, and George Hinchliff was given the contract for erecting the building.

The Chicago & Western Indiana Railroad, Chicago, will erect a large electrical power station on Wallace street south of Forty-seventh street, the purpose being to replace steam with electricity for operating its suburban trains. The building will be 85 x 150 feet, one story in height. Contracts have already been placed for most of the equipment, including 1800 horse-power boilers to the Stirling Company, traveling link grates to the Green Engineering Company, Chicago; engines of 1500 horse-power to Fulton Iron Works, St. Louis; generators to the National Electric Company, and other equipment to the Ingersoll-Sergeant Drill Company, Stillwell-Bierce & Smith-Vaile Company, and others. Stevens & Tyler, Monadnock Block, Chicago, are the engineers.

Officials of the Rock Island Railroad state that there is absolutely no truth in published statements to the effect that that company would very greatly increase its shops at East Moline, making them car and locomotive shops instead of merely repair shops as at present.

The American-Mexico Mining & Developing Company, National Life Building, Chicago, is making extensive developments in its Mexican plants. Its plans include a 1000-ton smelter at Torreon and another at Velardena, Durango. It has already purchased a 100-ton lead smelter from the Allis-Chalmers Company, together with a 60 horse-power engine and boiler. A 60-ton smelter plant has been ordered from the McDonald Smelter Company, Toledo, Ohio; an 80 horse-power gasoline engine from Fairbanks, Morse & Co., and two 25 horse-power hoists from the Witte Gas Engine Company, Kansas City, Mo. The company is also in the market for about 100 electric drills and a number of hoists. It will also shortly be in the market for about 5000 horse-power in boilers.

The Chicago, Milwaukee & St. Paul Railroad Company is adding a passenger car repair shop to its plant at Milwaukee.

This is housed in a steel building, 90 x 575 feet, in dimensions. Next spring the two car department buildings will be extended 200 feet, and a new pattern shop, 60 x 150 feet, two stories high, will be added. The power plant is also being increased 40 per cent. by the installation of Erie boilers already purchased. At present the road is making its own locomotives and many of its box cars, the plant at the present time turning out 11 box cars a day and five locomotives a month.

The unusual activity in the erection of steel structures for office buildings continues, and this is soon to be augmented with a number of large structures for mercantile purposes. The Boston Store, belonging to the Netcher Estate, has practically perfected plans for the erection of a 16-story building to occupy almost half of a large city square. Holabird & Roche, the architects, say that active building operations will not begin until next spring. Another 16-story steel building for State street has been decided upon adjoining the new Chicago Savings Bank building to the south, numbered 138 to 144 State street. Holabird & Roche are also architects for this building. Stumer, Rosenthal & Eckstein are the owners. A 12-story steel building will be erected at the southwest corner of State and Jackson streets by the same owners. The Fair, a building covering a full half block at State, Adams and Dearborn streets, will be increased in height by two stories, the present roof being retained. Just west of the proposed building on Jackson and State streets will be erected a new theater building by Weber & Fields of New York. A feature of this building will be a restaurant and casino in addition to the theater.

The Corn Exchange National Bank has leased 75 x 128 feet at the northwest corner of La Salle and Adams streets, and will erect thereon either a distinctively banking building or a tall office building with bank floors. The Northern Trust Company's new 16-story bank and office building will be a block further north, occupying the corresponding corner at La Salle and Monroe streets. The Marquette Building, a 17-story steel structure, at Dearborn and Adams streets, will be extended westward to the east line of the Quincy Building at the corner of Clark street.

An unusually large number of permits for factory buildings are being taken out, indicating a revival in industrial enterprise, which had been discouraged or prevented during the last three years by the attitude and strength of organized labor in Chicago. September building permits call for 929 structures, valued at \$6,671,920, against 602 buildings, costing \$2,248,285, covered by permits for September a year ago, a gain of nearly 300 per cent.

A. Bolter's Sons, structural steel workers, have purchased for the extension of their plant the following equipment among others: A 500-foot air compressor from Ingersoll-Sargent, a rotary shear and an angle shear from George Whiting Company, straightening and bending machines from Hansell-Elcock Company, three air hoists from Curtis Company Mfg. Company, St. Louis; a number of riveting hammers from the Chicago Pneumatic Tool Company, the electrical equipment has not yet been decided upon. The addition to the present plant will have an area of 50 x 75 feet, three stories in height. The upper floor will be a template shop, the second floor a machine shop and the ground floor an extension to the structural shop.

The Kewanee Boiler Company has secured an order for about a dozen tubular boilers for Chicago city schools. Chas. Haffner, proprietor of the Western Boiler Works, has also secured orders for a number of boilers for public schools. Several months ago the city passed a new boiler inspection ordinance, which was printed in *The Iron Age*, and to comply with the agreements of this ordinance it was necessary to remodel and replace more than 40 boilers in public school buildings. This work has been in progress all summer, and it is now practically completed.

W. D. Ball, First National Bank Building, Chicago, is engineer for the mechanical work for the large shoe manufacturing plant being erected by the Spinks Mfg. Company, at Geneva, Ill.

The McDonald Engineering Company, Chicago, has let contracts as follows on the Rosenbaum elevator at Kansas City: 500 horse-power tandem Corliss engines, Allis-Chalmers Company; four 150 horse-power tubular boilers, Gem City Boiler Company, Dayton, Ohio; elevating and conveying machinery, Webster Mfg. Company, Chicago; valves, &c., Skillen & Richards, Chicago; 2000 tons structural and other steel, Scully Steel & Iron Company, Chicago.

The Chas. F. Elmes Engineering Works, Chicago, are extremely busy, working its plant until 9 or 10 o'clock each night. Its work is of a general character, embracing the building and repairing of heavy machinery of every class. On the floor at the present time is a huge machine, weighing 10 tons or more for making metal lath, which is being completed for the Northwestern Expanded Metal Company. The same shop is turning out a line of machinery for paper mills, and is now making a reel for the Chicago Daily News for handling rolled print paper.

The United States Engineer's office, 1637 Indiana avenue, Chicago, has let the following contracts for improvements on the Illinois and Mississippi Canal, details of which were given in our issue of August 25: Group 1, aqueducts and

bridges to the Springfield Bridge & Iron Works, Springfield, Ill.; group 2, sluice gates to the Modern Steel Structural Company, Waukesha, Wis.; group 3, 29 lock gates to the Variety Iron Works, Cleveland, Ohio.

The Green Engineering Company, manufacturer of traveling link gates, Chicago, mentions among some of its important sales made recently, the following: Standard Sanitary Mfg. Company, Louisville, Ky., 1000 horse-power; Department of Electricity, Chicago, 1500 horse-power; Henry W. Oliver Estate, Pittsburgh, Pa. (second order), 500 horse-power; Curtis & Co. Mfg. Company, St. Louis, Mo., 400 horse-power; Chicago & Western Indiana Railway Company, Chicago, 1800 horse-power; Chicago & Northwestern Railway Company, Chicago (second order), 2000 horse-power; Iowa Central Railway Company, Hocking, Iowa, 500 horse-power.

The Aetna Foundry & Machine Company, Springfield, Ill., has recently sold among others the following hoisting engines: Eureka Coal Company, Marissa, Ill.; Island Grove Coal Company, Berlin, Ill.; Manufacturers' Fuel Company, Du Quoin, Ill.; Hailey-Ola Coal Company, Haileyville, I. T.

Manning, Maxwell & Moore, Chicago, have made the following among other sales: To the Southern Railroad for its shops at Princeton, Ind., a 130-ton crane with two 50-foot hoists and a 150-ton transfer table; to the Louisville & Nashville for its shops at Nashville five Hilles & Jones punch and shears and five 200-pound Bradley hammers, to the Frisco road for its St. Louis shops one Hilles & Jones double punch and shear, to the Rock Island arsenal, Rock Island, Ill., eight lathes and a number of presses and profiling machines. The sale to the Frisco road was made through the company's St. Louis representative, Charles L. Lyle, who also sold to the Commonwealth Steel Company for its Granite City, Ill., plant three Cincinnati Shaper Company's 30-inch shapers.

Pawling & Harnischfeger, Milwaukee, Wis., made the following crane sales among others during the month of September: To Wm. E. Peck & Co., New York, one crane for export to South America; McConway & Torley Company, Pittsburgh, one crane; Atchison, Topeka & Santa Fé Railway Company, Streator, Ill., one trolley; the Lorain Steel Company, Johnstown, Pa., one crane; the Coe Brass Mfg. Company, Torrington, Conn., two cranes and two hoists; Bedford Quarries Company, Oolitic, Ind., two cranes.

Contract for the 1,500,000-gallon pump for the city of South Milwaukee, Wis., has been secured by the International Steam Pump Company, whose bid was \$3900. The contract for making alterations and additions to the pump house was secured by Jesse Cooger, Milwaukee, his bid being \$2165.

The Kewanee Boiler Company, Kewanee, Ill., has recently installed two boilers of 125 horse-power, each at the plant of the David Bradley Mfg. Company, Bradley, Ill.

The Chicago House Wrecking Company, Chicago, reports an improvement in the demand for machinery, and mentions among its orders a Westinghouse compound engine, several large boiler orders for the South, the equipment for one complete electric lighting plant, one diamond prospecting core drill, one large mining hoist, and many small items, including pumps, air compressors, rock drills and quarrying machinery.

The Northern Engineering Works, crane builders, Detroit, Mich., report among recent shipments and sales of electric, hand traveling and jib cranes, the following: United States Light House Board, Detroit, two 6-ton; Van Dorn Iron Works, Cleveland, one 15-ton electric; Proximity Mfg. Company, Greensboro, N. C., one 20-ton; Barnhart & Davis, Warren, Pa., one 5-ton; Dow Chemical Company, Midland, Mich., one 5-ton; city of Springfield, one 15-ton, with runway complete. The company reports a large increase of inquiries during the past month.

The American Machinery Company, Grand Rapids, Mich., reports among others the following purchasers of Oliver hand jointers, Universal saw benches, wood trimmers, &c., in September: Joliet & Chicago Electric Railway Company, Atchison, Topeka & Santa Fé Railway Company, Topeka, Kan.; Cox Bros. & Co., Drifton, Pa.; Massachusetts Institute of Technology, Boston, Mass.; Montana Agricultural College, Bozeman, Mont.; Packard Motor Car Company, Detroit, Mich.; C. H. Chadsey, Thompsonville, Mich.; Homestake Mining Company, Lead, S. D.; Lehigh Coal & Navigation Company, Lansford, Pa.; York Mfg. Company, York, Pa.; Ferracute Machine Company, Bridgeton, N. J.; Portland Machinery Company, Portland, Ore.; Henry R. Worthington Plant, International Steam Pump Company, Harrison, N. J.; Bethlehem Steel Company, South Bethlehem, Pa.

The Wilmarth & Morman Company, Grand Rapids, Mich., reports recent sales of drill grinders to the Copper Queen Consolidated Mining Company, Douglas, Ariz.; Atlantic Coast Line Railway Company, High Springs, Fla.; Jno. Ramming Machine Works, St. Louis, Mo.; Vulcan Iron Works, Hoquiam, Wash.; Louisville & Nashville Railway, Howell, Ind.; Erie Railway Company, Hornellsville, N. Y.; Jersey City, N. J., and Port Jervis, N. Y.; State University, Baton Rouge, La.; Diamond Polishing and Cutting Industry of America, Brooklyn; General Railway Signal Company, Buffalo; United States Mint, Denver; Three Rivers

Railway & Supply Company, Three Rivers, Mich.; J. Wiss & Sons Company, Newark, N. J.; Bureau of Standards, United States Government; four were sold to Australia, four to Russia and one each to Zurich, Switzerland; Japan, England, Cuba and Buenos Ayres, South America.

Edward B. Ellicott, city electrician of Chicago, is advertising for bids on steam superheater equipment for three 500 horse-power Kewanee water tube boilers for the Fullerton avenue electrical station. Bids close October 10.

Contracts have been let as follows by John J. Cummings of the McGuire-Cummings Mfg. Company, 122 North Sangamon street, Chicago, for a new plant being built at Paris, Ill.: Three 150 horse-power boilers, one 350 horse-power engine, one 450 horse-power boiler feed pump and feed water heater in proportion, to the Atlas Engine Works, Indianapolis, Ind., and the Erie City Engine & Boiler Works, Erie, Pa.; one 150-kw. generator, one 100-kw. generator and about 60 motors ranging from ½ to 20 horse-power, Westinghouse Electric & Mfg. Company; wood working machinery American Machinery Company, Grand Rapids, Mich.; forging machinery and bulldozer, Ajax Mfg. Company, Cleveland, Ohio.

The Philadelphia Machinery Market.

PHILADELPHIA, PA., October 3, 1904.

Business in the Philadelphia machinery market during the past week has been somewhat disappointing. It was expected among many manufacturers of tools and machinery that after the usual summer dullness some improvement would be in evidence, but trade during September was, if anything, quieter. There have, of course, been exceptions; here and there an increase of orders is to be noted, but such cases are few, and do not reflect the general condition of the trade. In most cases it is found that manufacturers have taken on enough new business to enable them to hold their own and keep wheels moving, but there are other instances where a further decline in orders is to be noticed. The market, on the whole, is very irregular, and manufacturers making a more or less extensive line of machinery or tools have noticed the entire absence of business for a number of their products with a corresponding increase in the demand for one or two articles, orders for which have enabled them to keep their plants in operation.

While there is the utmost confidence in the ultimate return of prosperous conditions, there is little belief in any immediate resumption. Inquiries have declined in almost all branches of the trade, and it is expected that but little business will be placed during October. The Presidential election is mentioned as the main cause for delay at this time. After the November election, however, manufacturers are looking forward to the real improvement, but whether or not actual business will then be placed in any quantity is still a question. In nearly all lines of business the present year so far has not been of the dividend declaring variety and buyers therefore, in order to make as favorable a showing as possible in their annual statements, will, it is thought, be inclined to postpone, if possible, actual purchases until after the turn of the year. In this respect we are advised of instances, particularly in the railway field, where purchases have actually been authorized but for various causes are being withheld, it is said, until later in the year. The railways are expected to be among the earliest purchasers of tools and machinery, specifications for which in many cases have been placed sparingly and for replacement needs only. While orders for motive power are being held up, at the time, some large requirements are said to be absolutely needed, and orders for locomotives, it is confidently expected, must come out at an early date.

Meanwhile manufacturers' books are beginning to get pretty bare of orders, the larger plants in some lines facing a still further reduction of working forces and hours. Just how this can be done without practically shutting down is a problem which interests not a few. Week to week orders manage to keep the smaller plants in some kind of operation, but the larger plants will require quite extensive orders to place them on any kind of an economical basis.

The foreign demand for machinery and tools does not show much improvement. Those transacting business regularly for foreign account advise us of declines in many branches, while others are just holding their own. Pneumatic tools and machinery, however, are still in good demand. The so-called Japanese and Russian business, as far as tools and machinery are concerned, has not been felt to any extent in this territory. On the whole, with existing

conditions, both at home and abroad, little improvement is anticipated in foreign demand at this time.

Deliveries on machinery and tools of all kinds can be promptly made. Standard goods in both large and small sizes can be found on dealers' floors or in manufacturers' stock rooms, and immediate shipment could be had in almost every case. Rush orders for special tools can be filled expeditiously, the operation of the some time idle tools aiding materially in some shops in making quick delivery on this class of goods.

Foundries, both iron and steel, continue dull; most of the plants are still running irregularly, there being no increase in demand from machinery, building and the general casting trade. Gray iron foundries are probably less active than the steel casting plants, though even the latter could handle considerable more work without taxing their capacities. There is little change noticeable in the price of castings. On ordinary work they continue weak, while for special work and castings subject to specifications they are probably firmer.

Machinery and machine tool dealers report only a fair month's business, the demand being quite irregular, and the total volume for September was scarcely up to that of the previous month. Some dealers say that they have opened up a number of new accounts, which should be an encouraging feature. Transactions, on the whole, have been light, but considerable business is anticipated in the near future.

The dealers in the smaller engines, boilers, &c., report a slight improvement, but there is still a tendency to defer business of this class until later in the year. The demand for machine shop supplies is weak and reflects the general conditions of the trade.

Prices for machinery and machine tools continue more or less unsettled. On some lines they are said to be firmly maintained, while on others they are decidedly weak. Active competition continues on all lines, and prices are said to suffer considerably in some instances.

The Schutte & Koerting Company which has recently acquired property on both Thompson and Twelfth streets adjoining its present plant, as was previously noted in these columns, is preparing to erect buildings on the property purchased. On the Thompson street side, stables and an addition to the office will be built, while on Twelfth street a building to accommodate the heavy valve and other work will be erected. Plans for both these additions are now practically completed, but the specifications for new machinery and equipment will probably not be out before the first of next year.

The Otto Gas Engine Works, while it has purchased the necessary ground, &c., at Wilmington, Del., is still undecided as to the ultimate removal of its plant to that city. Certain franchises regarding the manufacture of gas for its own and other purposes are holding up action at the time, and until these matters are determined no final action regarding the removal will be taken.

The American Pulley Company notes but little change in the volume of September business when compared with the previous month. Orders are plenty, but buyers are taking pulleys in small quantities only. This same condition is apparent both in the foreign and domestic trade. The South is the best order producing territory at this time, while good inquiries are being received from the West. Export deliveries to Australia, New Zealand and Continental Europe continue about the same, except the quantities are less, while carload shipments to the Southern States are to be noted among domestic deliveries.

The Phillips Pressed Steel Pulley Works, Fourth and Glenwood avenues, is now placing on the market its new all steel pulley, described in *The Iron Age* some months ago. These pulleys are now ready for delivery in sizes 18, 20, 22, 24, 26, 28, 30, 32, 34 and 36 inches in diameter, and 3, 4, 5, 6, 8, 10 and 12 inch face, with both smaller and larger sizes in course of manufacture. A very good demand is reported for these pulleys, and from the number of inquiries in hand, the indication for future business is considered very favorable.

The Standard Pressed Steel Company, manufacturer of the American Pioneer pressed steel shaft hanger, advises us that business is progressing very favorably. A number of additional agencies have been established for the sale of these hangers. At this time the best demand comes from the South and Middle West. Inquiries are fairly good, some for complete equipment of large plants having recently been received.

The Thos. H. Dallett Company has had a good month's business in pneumatic tools, particularly for export. This demand includes both the regular lines of tools and their special stone working and dressing tools. In order to better handle this business the company has established an agency for the British Isles with C. W. Burbon, Griffiths & Co., London, England. The demand for the general and special machine tools made by the Dallett Company is weak, although from the nature of recent inquiries the prospect for improvement is favorable.

The Philadelphia Pneumatic Tool Company continues operating its plant on full time. Inquiries for the various tools have been good both from foreign and domestic sources.

In the foreign field England leads in point of orders, followed by Germany and France. A number of tools, principally rammers for railway work, have also been shipped to Italy. The South American countries are also coming into the market for pneumatic tools, this company having furnished the Central Railway of Brazil, with a number of tools for shop work. Concrete cement operations have opened up another field for pneumatic rammers, and considerable business has been done along that line. The shipments during the past month have, we are told, been fully up to the average, and cover deliveries to all parts of the country.

The Falkenau-Sinclair Company, manufacturer of presses and special tools, continues fairly active. Inquiries are irregular, and lead up to business slowly. The past month has not brought out much new business, but conditions are favorable for material betterment. Among some of the recent deliveries by this company may be mentioned cartridge loading presses for the United States Government, delivered to the Frankford Arsenal, this city. A large cornice press was also shipped to Pensacola, Fla. Standard and double acting presses have also been shipped various parties, as have also sprue cutters and a loom press. A good demand is maintained for cement testing machines, several of which have been recently shipped.

I. H. Johnson, Jr. & Co., Incorporated, note a material increase in business; some very nice orders for lathes have been taken during the past month, and prospective business is exceedingly favorable. Inquiries are good, and have lead up to business promptly. The Middle West has probably been the best field recently, but other territory is developing satisfactorily. A number of lathes have recently been shipped—several to Chicago, Milwaukee and in the Pittsburgh district.

The Espen-Lucas Machine Works is fairly busy. Inquiries have been rather slow during the last half of the month, but several good orders were taken. Two horizontal floor boring machines were recently shipped Pittsburgh, Pa., parties, while several steel foundry cold saw cutting off machines have been shipped to the Middle West. An I-beam saw was delivered to local concerns, and several bar saws were sent to parties in New York State.

The Tabor Mfg. Company continues busy. Orders for the past few months have been fully up to the previous few months, which were the best in the existence of the company. The demand for molding machines comes from all branches of the foundry trade. Stove foundries have recently made considerable inquiry, and the Tabor Company is now building a special jar ramming machine to take in such light deep work as heater ash pits, &c. Among recent orders for molding machines was one for 24 squeezers for the Draper Company, Hopedale, Mass.; six power squeezers for a Western malleable iron works, and a large vibrator frame machine for the Rock Island Arsenal. Four machines are building for the Connecticut brass trade, as is also a 16 x 21 split pattern machine for export to Belgium and a jar ramming machine for export to Scotland. The Tabor Company also notes an increased demand for Taylor-Newbold saws and a large number have been shipped to various concerns. A 36-inch saw has been shipped for export to England, and recent orders include a 32-inch saw for the Hippenstall Forge & Knife Company, Pittsburgh, Pa., and other sizes for the Buckeye Steel Company, Columbus, Ohio; the Otis Steel Company, Cleveland, Ohio, and the Latrobe Steel Works, Latrobe, Pa.

The Alfred Box Company, Incorporated, continues moderately busy. There has been a fair demand both for cranes and hoists, and an increase has been noted in the past month's business. Among recent deliveries may be mentioned two 5-ton three-motor electric traveling cranes and a 10-ton traveling gantry crane for the John A. Roebing's Sons Company, Trenton, N. J.; a 5-ton three-motor electric traveling crane for H. J. Rench, Newark, N. J., for foundry equipment. A 5-ton electric jib crane was delivered to Butterworth & Sons, in this city, and one of the same type was sent to the Delaware Foundry Company, Burlington, N. J.

The Energy Elevator Company notes a slight improvement in demand for elevators from out of town sources; the local demand, however, remains quiet. Among recent orders was one from the United States Government for 13 safety lifts to be installed in the new officers' quarters at the Naval Academy, Annapolis, Md. An order for one of the same style lifts has also been received to be installed in the State Capitol building at St. Paul, Minn. Among recent deliveries by the company may be noted freight lifts for parties in Vincennes, Ind.; Phoenixville, Pa.; Rome, Ga.; Norwalk, Conn.; Baltimore, Md.; Buffalo, N. Y.; Trenton, N. J., and Bedford, Pa.

At the Baldwin Locomotive Works conditions remain unchanged. The demand for locomotives is light, and the past month's orders have not improved over those of August. The plant is being operated on short time, with reduced forces. Considerable work is still on its books, and deliveries during the month have been fair. Indications, however, point to a material improvement in business in the near future, as the

placing of orders for a number of engines is in instances being held up only temporarily. Recent deliveries include shipments of engines for the Atchinson, Topeka & Santa Fé; Chicago, Burlington & Quincy, and the Southern railways as well as to several individual concerns.

The Philadelphia Roll & Machine Company reports a very good demand for both chilled and sand rolls and record tonnages have been made in castings of that class. The demand for rolling mill machinery is light, but quite a business has developed in chilled dies for forging and stamping plants. Recent shipments include a number of dies for delivery in the western part of the State, while both chilled and sand rolls have been furnished many of the Eastern iron and steel mills.

The New York Machinery Market

NEW YORK, October 5, 1904.

Machinery and supply merchants in this city are manifesting considerable interest in the movement which has been started to form one or more organizations similar to the Southern Supply and Machinery Dealers' Association to cover the other sections of this country. The first definite move in the direction of organization has been made in the selection of Cleveland for a meeting to be held on October 18 and 19. All supply and machinery merchants located in any of the Eastern, Central or Western States are invited to attend this meeting. It is intended at that time to define the lines for organization and launch either one large association or two or three bodies to take care of the territories represented. An open letter to supply and machinery dealers, signed by prominent merchants of Cleveland, Cincinnati, Syracuse, Chicago, Pittsburgh, Boston and Seattle, states:

"As you are probably aware, the question of forming Supply and Machinery Dealers' associations in the North, East and West—similar to the Southern Supply and Machinery Dealers' Association has been given very careful, and serious consideration for some little time by quite a large number of the supply and machinery dealers from various sections, and we are pleased to state that from the encouragement which we have received, we have decided to take steps to perfect the organization.

"It has been deemed advisable to call a meeting of the supply and machinery dealers in Cleveland, Ohio, on October 18 and 19, and to this end Mr. Carter will open up correspondence with you regarding these details, &c. We, therefore, trust that you will promptly and cheerfully answer any inquiries which may be addressed you, and it is also our sincere hope that you can see your way clear to attend the Cleveland meeting at the time fixed, and that you will become a charter member of the association. We are fully satisfied that an organization among the supply and machinery dealers in the North, East and West will result greatly to the advancement of our line of business and prove highly remunerative to the individual members."

From the reports gathered in this city the indications are that the Cleveland meeting will be well attended, and, judging from the enthusiasm shown by the parties interested, a strong organization will be formed. It is also probable that a large number of representatives of manufacturers of machinery and steam specialties and supplies will attend the Cleveland meeting, as the Southern Association has been followed very closely by the producers of the goods handled by its members. These same manufacturers will, of course, be vitally interested in the doings at Cleveland and will, in fact, be more directly affected by any organizations in the North, East and West than they are in the case of the Southern Association. In order to show proper consideration for the manufacturer the Southern dealers have in their conventions provided open sessions, to which the producers have been invited and at which matters affecting both interests directly have been brought up for discussion. So much interest has been displayed in these discussions by the manufacturers that, as a result of the last convention held at Old Point Comfort last April, an associate membership to the dealers' association was created to which the manufacturers are eligible. Many prominent concerns producing steam specialties and machinery supplies of all kinds have availed themselves of this opportunity. A number of machinery and supply merchants who deal extensively in machine tools are showing a lively interest in the coming meeting at Cleveland, and it is very likely that in the case of the proposed organization or organizations the machinery end will figure very much more heavily than it does in the Southern Association. An idea of the purpose of the proposed association or associations can be gleaned from the declaration of principles of the Southern Supply and Machinery Dealers' Association, which is as follows:

"The object of the association shall be the promotion of more friendly business relations and mutual confidence and good will with each other and with the manufacturers; and to encourage and promote the commercial interests of the supply and machinery dealers of the South in every way possible; and to assist the manufacturers in deciding who are legitimate dealers in supplies and machinery, and who

are entitled to prices as such; and to discourage the manufacturers from dealing direct with the consumer, but if any manufacturer finds it necessary to deal direct with the consumer in order to introduce and create a demand for his goods, he will invoice said goods through some dealer in the territory where the goods are sold."

The address of C. B. Carter, the organizer of the new movement, is 313½ West Clinch avenue, Knoxville, Tenn.

Probably the most interesting matters in connection with the machine tool trade at present concern the purchases of the Navy Department. Specifications of considerable importance are constantly being issued, and the purchases on this account are running rather heavily nowadays. The War Department is also purchasing liberally for the various army arsenals. A large additional order for the Rock Island Arsenal has just been placed with Manning, Maxwell & Moore. It calls for Reed and Hendey lathes, Bliss presses and miscellaneous Garvin machines.

There is talk of further purchases to be made by the Japanese Government in the way of machine tools, but nothing definite can be learned at this time to verify the report. The Russian Government has been in this market during the last few days for several electric traveling cranes. Prompt delivery was the principal consideration, as the cranes are destined for use in the Obuchoff Arsenal and it is desired to have them delivered before navigation closes. The competition has been chiefly between American and German crane builders. Two 5-ton machines have been awarded to Manning, Maxwell & Moore, sole agents for the Shaw Electric Crane Company of Muskegon, Mich. The larger sizes have not been awarded as yet. Manning, Maxwell & Moore also received orders for two large Shaw cranes from the Southern Railway Company. One is to be of 120 tons capacity and one of 150 tons capacity, and they are to be installed at the new shops of the road at Princeton, Ind. The American Car & Foundry Company also purchased two 5-ton electric travelers from this company, to be installed in its plant at Berwick, Pa.

The Phoenix Bridge Company, Phoenixville, Pa., which is building the Quebec Bridge over the St. Lawrence River, has just placed contracts with the Lidgerwood Mfg. Company for four electric hoists, which will be the largest machines of their type ever built. They will weigh about 25 tons each, and will have a capacity of more than 110 tons each. The amount of the contract is about \$35,000.

As work on the Pennsylvania Tunnel progresses, each week brings forth further contracts for the mechanical equipment for its construction. The O'Rourke Engineering Construction Company has lately placed several orders for machinery and other material, the most important of which was secured by the Lidgerwood Mfg. Company, New York. This was for the duplicate system of electric shaft hoists, cages, &c., to form the entire elevating outfit for the shafts of the North River section, located at Weehawken, N. J., and at the foot of West Thirty-fourth street, New York, respectively. Four Ball & Wood high speed engines have also been purchased. These engines are to be of 160 horse-power each and are to be direct connected to four General Electric generators. The order for suction pumps was placed with the Blake & Knowles Steam Pump Works, and that for the oil separators and water heaters with F. E. Idell, New York. The National Malleable Castings Company, Sharon, Pa., has secured the contract for 3000 tons of steel castings for the interior fittings.

It has not yet been ascertained just what new machinery will be required by the Bethlehem Steel Company, South Bethlehem, Pa., for equipping the new buildings that are to replace those destroyed in the recent fire. The shops burned were the construction, carpenter, pattern and paint shops, all contained in one building, east of No. 3 rolling mill. The company was successful in saving a number of valuable patterns which were in course of construction in the pattern shop, as well as a number of machines in that department. The damage is estimated at about \$40,000.

Woodward, Wright & Co., Limited, New Orleans, La., have received preliminary estimates for the construction of the proposed new dry dock, but it has not yet been decided whether the dock will be built by themselves or by contract. The great bulk of material required will consist of lumber, bolts, nuts, &c., but there will also be needed machinery to the amount of about \$12,000.

The Philadelphia Rapid Transit Company will soon be in the market for a complete new machine shop equipment of considerable size. The contract for the building has just been awarded. R. C. Heath, assistant engineer, whose office is located at 820 Dauphine street, is handling the details of the work for W. S. Twining, chief engineer of the company.

The following additional awards have been made for supplies for the League Island and Washington navy yards and the Naval Academy at Annapolis:

Manning, Maxwell & Moore, New York, class 22, two swing wood turning lathes, \$104; class 23, one single spindle electrically driven sensitive drill, \$108; class 25, one Boyer long stroke riveting hammer, No. 5, \$95.

No award has been made for class 26, one Blake vertical single acting twin beam air pump.

The following bids were opened September 27 for supplies for the various navy yards:

League Island, Washington and Annapolis.

- Bidder 11. Akron Electrical Mfg. Company, Akron, Ohio.
 13. Niles-Bement-Pond Company, New York.
 29. Thresher Electric Company, Dayton, Ohio.
 30. Ideal Electric & Mfg. Company, Mansfield, Ohio.
 33. Wm. Sellers & Co., Philadelphia, Pa.
 46. Standard Koller Bearing Company, Philadelphia, Pa.
 59. McCay Engineering Company, Baltimore, Md.
 64. The Fairbanks Company, New York.
 66. Drew Machinery Agency, Manchester, N. H.
 67. Stanley & Patterson, Incorporated, New York.
 70. Smith-Courtney Company, Richmond, Va.
 77. D'Olier Engineering Company, Philadelphia, Pa.
 86. Crocker-Wheeler Company, Ampere, N. J.
 95. Union Steel Casting Company, Pittsburgh, Pa., by
 J. B. Kendall, Washington, D. C.
 96. J. B. Kendall, Washington, D. C.
 102. National Electrical Supply Company, Washington, D. C.
 106. Fox Bros. & Co., New York.
 107. Manhattan Supply Company, New York.
 113. General Electric Company, Schenectady, N. Y.
 117. Berry & Aikins, Philadelphia, Pa.
 125. Montgomery & Co., New York.
 128. The Mayer-England Company, Philadelphia, Pa.
 136. The George F. Blake Mfg. Company, New York.
 141. Edward J. Etting, Philadelphia, Pa.
 153. C. & C. Electric Company, New York.
 156. The Ingersoll-Sargent Drill Company, New York.
 157. J. Edward Ogden Company, New York.
 159. Holter-Cabot Electric Company, Brookline, Mass.
 164. Patterson, Gottfried & Hunter, New York.
 165. Manning, Maxwell & Moore, New York.
 167. Walker & Kepler, Philadelphia, Pa.
 171. Sanson & Rowland, Philadelphia, Pa.
 178. Buffalo Forge Company, Buffalo, N. Y.
 Class 1. Eight electric motors—Bidder 30, \$2285; 59, \$2480; 86, \$2521.50; 159, \$2698; 167, \$2733.32; 11, \$2745; 128, \$2850; 29, \$2934.50; 156, \$3006; 77, \$3013; 113, \$3102.
 Class 2. Two 3 horse-power electric motors—Bidder 11, \$276; 86, \$300; 30, \$334; 113, \$366; 29, \$370; 153, \$398; 167, \$399; 77, \$420; 59, \$490; 128, \$500; 159, \$504.
 Class 3. Two direct current electric motors—Bidder 30, \$480; 86, \$539; 113, \$578; 11, \$608; 159, \$656; 167, \$684.60; 128, \$700; 77, \$750; 59, \$860.
 Class 4. One shunt wound direct current motor—Bidder 86, \$212; 29, \$240; 30, \$240; 113, \$255; 102, \$260; 153, \$274; 11, \$285; 159, \$286; 67, \$295; 128, \$315; 167, \$315; 77, \$370.
 Class 44. Cleveland Twist Drill Company's taper reamer—Bidder 125, \$91.95; 171, \$93.50; 164, \$95.27; 107, \$104.33; 96, \$106.22; 43, \$106.59; 128, \$106.95; 106, \$118.05; 64, \$122.35.
 Class 45. Morse taper shank counterbore, shell reamers, &c.—Bidder 165, \$142.89; 43, \$144.22.
 Class 67. Six new Boyer hammers and Little Giant drills—Bidder 156, \$420; 95, \$450; 66, \$549.60; 107, \$590.40; 106, \$600; 141, \$600; 182, \$684.
 Class 69. 12 vises—Bidder 162, \$164.28; 125, \$165; 94, \$165.72; 177, \$166.80; 165, \$168; 106, \$172.68; 64, \$172.80; 107, \$172.80; 141, \$180; 66, \$183.60; 145, \$189.
 Class 70. One geared crane table—Bidder 117, \$125; 141, \$125; 107, \$134; 79, \$145.
 Class 71. One galvanizing kettle—Bidder 62, \$266.38; 69, \$400; 117, \$574.
 Class 72. One duplex double acting feed water boiler pump—Bidder 136, \$203.50; 64, \$220, \$230 and \$255; 178, \$220.40; 66, \$232, \$260 and \$270; 157, \$239; 106, \$242.44; 117, \$299; 165, \$314.
 Class 73. One slotting machine, 16 inches—Bidder 13, \$1855; 165, \$1900; 33, \$1930; 70, \$1999; 64, \$2040; 66, \$2080.
 Class 74. One slotting machine, 10 inches—Bidder 70, \$770; 13, \$845; 165, \$890; 64, \$950 and \$740; 66, \$1000; 33, \$1045.
 Class 75. One No. 2 horizontal boring and drilling machine—Bidder 13, \$2450; 165, \$2450.

New York, League Island, Norfolk, Pensacola, Puget Sound and Washington.

- Bidder 1. Tatham & Brown, San Francisco, Cal.
 2. Harron, Rickard & McCone, San Francisco, Cal.
 3. Bentel & Margedant Company, Hamilton, Ohio.
 4. H. B. Smith Machine Company, Smithville, N. J.
 5. Estate of H. A. Rogers, New York.
 6. Cleveland Crane & Car Company, Wickliff, Ohio.
 7. Wellman-Seaver-Morgan Engineering Company, Cleveland, Ohio.
 8. Case Mfg. Company, Columbus, Ohio.
 9. Northern Engineering Works, Detroit, Mich.
 10. Pawling & Harnischfeger, Milwaukee, Wis.
 11. Wm. Sellers & Co., Incorporated, Philadelphia, Pa.
 12. Becker-Brainard Milling Machine Company, Hyde Park, Mass.

13. Brown & Sharpe Mfg. Company, Providence, R. I.
 14. North Penn Iron Company, Philadelphia, Pa.
 15. Drew Machinery Agency, Manchester, N. H.
 16. Halliday-Henshaw-Bulkeley Company, Seattle, Wash.
 17. Caldwell Bros. Company, Seattle, Wash.
 18. Handlan-Buck Mfg. Company, St. Louis, Mo.
 19. Garvin Machine Company, New York City.
 20. Prentiss Tool & Supply Company, New York City.
 21. Morgan Engineering Company, Alliance, Ohio.
 22. Pratt & Whitney Company, Hartford, Conn.
 23. Alliance Machine Company, Alliance, Ohio.
 24. American Tool Works, Cincinnati, Ohio.
 25. Motley Green & Co., New York.
 26. Edw. J. Etting, Philadelphia, Pa.
 27. J. W. Cregar Agency, Philadelphia.
 28. New Doty Mfg. Company, Janesville, Wis.
 29. J. B. Roach, Brooklyn, N. Y.
 30. Fairbanks Company, New York City.
 31. Niles-Bement-Pond Company, New York.
 32. Sherman-Brown-Clements Company, New York.
 33. Manning, Maxwell & Moore, New York.
 34. Van Dyck-Churchill Company, New York.
 35. Henry Pels & Co., New York.
 36. Bement, Miles & Co., Philadelphia, Pa.
 37. Cleveland Punch & Shear Works Company, Cleveland, Ohio.
 38. Williams, White & Co., Moline, Ill.
 39. Witter-Corbin Machinery Company, Seattle, Wash.
 40. Hendy Machine Company, Torrington, Conn.
 41. W. & L. Sargent, Fitchburg, Mass.
 42. Williamson Bros. Company, Philadelphia, Pa.

Class 1. Two improved gap lathes—Bidder 20, \$852; 24, \$710; 31, \$732; 33, \$538.

Class 2. One gap lathe—Bidder 20, \$491; 31, \$477; 33, \$765.

Class 3. Four 16-inch swing back geared engine lathes—Bidder 5, \$1236; 19, \$1416; 22, \$1904; 24, \$2000; 29, \$1476; 30, \$1480 and \$1500; 31, \$1792; 33, \$495, \$550, \$454 and \$464; 34, \$1860; 40, \$2240; 41, \$1548.

Class 4. One engine lathe—Bidder 19, \$550; 22, \$965; 24, \$685 and \$705; 30, \$520; 31, \$542; 33, \$700; 40, \$750.

Class 5. One vertical drilling machine, motor driven—Bidder 18, \$178; 19, \$225; 20, \$213; 24, \$250 and \$270; 27, \$195; 30, \$175 and \$278; 31, \$325; 33, \$228.

Class 6. One universal milling machine No. 2, motor driven—Bidder 12, \$1028; 13, \$960 and \$1010.50; 19, \$795; 27, \$880; 30, \$774; 33, \$1025; 40, \$933.

Class 7. One crank back geared shaper—Bidder 19, \$575; 24, \$485 and \$505; 27, \$458 and \$495; 30, \$599, \$550 and \$490; 31, \$535 and \$573; 33, \$575 and \$540; 40, \$610.

Class 8. One double ended punching and shearing machine—Bidder 15, \$2295 and \$2896; 21, \$3985; 23, \$2850; 27, \$2880; 28, \$2400; 30, \$3232; 31, \$2722; 33, \$1920; 35, \$2900; 36, \$2479; 37, \$2390; 38, \$1730 and \$2130.

Class 9. One double ended punching and shearing machine—Bidder 15, \$6095 and \$5084; 21, \$5590; 23, \$4885; 27, \$5999; 28, \$4900; 30, \$5675; 31, \$5350; 33, \$4595; 36, \$4095; 37, \$4115; 38, \$5840.

Class 10. Two steam warping winches—Bidder 25, \$600; 32, \$717.48; 33, \$700; 42, \$930.

Class 11. One 8-inch four-sided molder—Bidder 1, \$458 and \$475; 2, \$624; 3, \$400; 4, \$425 and \$625; 15, \$462 and \$692; 16, \$508.41; 17, \$53.65; 25, \$432.50; 30, \$534; 33, \$830; 39, \$500.

Class 12. One single surface planer—Bidder 1, \$588, \$633 and \$650; 2, \$490; 3, \$540; 4, \$300 and \$475; 15, \$340; 16, \$247.56; 17, \$346.90; 25, \$295; 33, \$600; 39, \$500, \$630, \$510 and \$640.

Class 13. One tenoning machine—Bidder 1, \$245, \$246, \$265 and \$266; 2, \$275; 3, \$200; 4, \$300; 15, \$246; 16, \$214.41; 17, \$234.30, \$259.30 and \$254.30; 25, \$253.50; 33, \$295; 39, \$325.

Class 14. One overhead electric traveling crane—Bidder 6, \$8750; 7, \$8967; 8, \$7300; 9, \$6740; 10, \$7555; 11, \$8030; 14, \$7263; 21, \$5945; 23, \$7297; 26, \$7500; 31, \$6375; 33, \$7925 and \$6500.

The Manhattan Transit Company, New York, will purchase the vehicles it requires and is now ready to receive specifications and blue prints for electric omnibuses to carry about 24 passengers, inside only. It is requested that no original papers be submitted, as the company will not be responsible for the return of any papers forwarded. Address communications to the mechanical director, 250 East Forty-eighth street.

A tunnel under the Detroit River, at Detroit, Mich., will probably be constructed by the Michigan Central Railroad, which has for some time been considering the proposition of bridging it. Representatives of the company have been investigating the tunnel work around New York, and a careful examination of the Detroit River bed is now being made. If the reports are as favorable as is anticipated the work will probably be commenced at an early date. It is authorized by charters already secured from the two Governments.

Trade Publications.

Steel Manufacture.—The Tropenas converter steel process is the subject of a catalogue from Powell & Coiné, 11 Broadway, New York City, sole agents for the United States and South and Central America. The process was first used in England in 1891 and six years ago was introduced into this country. There are now over 84 Tropenas converters in use in foundries in various parts of the world, representing an annual output of 65,000 tons of steel castings. The remarkable toughness of the steel is illustrated by cuts showing pieces which have been bent and twisted cold without breaking. Other illustrations show the interior of works in which the converters are used and sample castings made by the process. The text discusses the process in all of its phases and tabulated results and curves from tests are given. The magnetic properties of the steel make it particularly suitable for electrical machinery, and several tests are cited in proof of it.

Rubber Belt Conveyors.—A new catalogue, known as No. 67 A, has recently been issued by the Jeffrey Mfg. Company, Columbus, Ohio, on the Century rubber belt conveyor. For the handling of coal, ores, broken stone, sand, gravel, &c., the belt is run on inclined pulleys to give it a trough form, and is furnished in continuous lengths or in sections with or without adjustable side guides. In handling boxes and bags the belt is run on straight faced pulleys. The book is mostly made up of illustrations showing the many different forms of conveyors for special services, the manners of driving and typical installations. The latter part of the catalogue shows parts and accessories, such as carriers, trippers, belts, &c., and also other forms of conveyor, such as flight and bucket types.

Electrical Apparatus.—From the General Electric Company, Schenectady, N. Y., the following have been received: Bulletin No. 4373, describing oil switches for high potential distributing systems; No. 4376, on street lighting by series direct current inclosed arc system. Bulletin No. 4380, type-T. D. voltage regulators for direct current generators. Flyer No. 2127, on wrought copper cable terminals; No. 2135, on a combined socket and shade holder; No. 2136, on parallel rod, edgewise wound and direct current, multiple 110 to 125 volt inclosed arc lamps, and No. 2137, on concealed rosettes with inclosed fuses. Supply catalogue No. 7585, on repair parts of G. E. 73-C and E railway motors; 7586, on repair parts of C. B. 15-G railway motors. Also indexes to bulletins, flyers, supply catalogues and price-lists to date.

Air Compressors.—A new catalogue from the Blaisdell Machinery Company, Bradford, Pa., known as bulletin No. 12, deals with self oiling air compressors. These are built in all types and sizes and for every purpose to which compressed air is put. A detailed description of the component parts is given, the text being illustrated with sectional drawings and half-tone engravings of details; also half-tones of the complete machine in several forms in which it is built. The latter include three self oiling steam driven compressors: class D, a single; class E, a duplex, and class F, a duplex two-stage machine. Classes A, B and C are the same as D, E and F, respectively, but are belt driven instead of steam driven. Class EB is a duplex self oiling motor driven air compressor. A table of the sizes and capacities and other dimensions with code words accompany each class. Air receivers for use in connection with the compressors are alluded to at the back of the bulletin, and table of sizes and weights is given.

NOTES.

The Robertson Mfg. Company, Buffalo, N. Y., has recently brought out four circulars dealing with its product. One of these illustrates the Robertson oscillating gas and gasoline engine, 4 horse-power, style B, giving an illustrated and complete description with specifications, dimensions, &c. The same circular also illustrates a No. 1 rapid cut power saw. The second circular illustrates and briefly describes the Hero No. 10 twist drill grinding attachment, No. 60 tool grinder, the Hero section knife and tool grinder No. 40, and Hero emery grinders Nos. 10, 20 and 30. The third circular deals with the Robertson rapid cut power saws made in four sizes, Nos. 1, 2, 3 and 4. Illustrations are given of each, with a few words concerning their special applications and advantages. The fourth circular deals specially with rapid cut power saw No. 4.

The firm of Henry R. Worthington has published a small map showing the location of its old works in South Brooklyn, the offices in Manhattan and the new works at Harrison, N. J., with the intercommunicating lines of transportation. The old works were founded in 1840 and now cover about 4½ acres and employ 2000 men. The new plant occupies a 34-acre tract, has 18 acres of floor space, and will accommodate 6000 workmen. It will be the largest industrial plant near New York, and embraces the latest improvements in production engineering.

A circular from the Automatic Machine Company, Bridgeport, Conn., illustrates a 12-inch by 4-foot 1904 pattern automatic threading lathe for cutting fine threads, straight or tapered, external or internal work; also relieving taps, dies and cutters. A description of this machine was given in *The Iron Age* of July 7, 1904.

The Gisholt Machine Company, Madison, Wis., is distributing a booklet of novel form. It simply gives illustrations of the general line of Gisholt machine tools with a few brief words accompanying them but without any attempt to go into details. The cuts and text are placed at the top of facing pages, leaving practically half a page of white space beneath. The last page

calls attention to the loose leaf bulletins which the company issues from time to time.

The Wm. B. Scaife & Sons Company, 221 First avenue, Pittsburgh, Pa., in a little pamphlet entitled "Water Softening and Purifying Systems on the Chicago, Rock Island & Pacific Railroad, Kansas Division," gives views of the various watering stations along the line, all of which use either the We-Fu-Go continuous or the Scaife automatic systems.

The National-Acme Mfg. Company, Cleveland, Ohio, has issued a pamphlet called the "Spirit of Progress." Its purpose is to exploit the Acme automatic multiple spindle screw machine. The illustrations include a view of the machine, several views of work performed upon it, and views of the Nos. 1 and 2 Acme semi automatic screw slotting machine.

Wyman & Gordon, Worcester, Mass., have added another to their series of Short Stories of Engineers. This one gives the life of William Symington, another of the early engineers whose work had much to do with the development of the steam engine but who reaped little benefit from his efforts. Inclosed with the biography is a leaflet showing a view of a large steam hammer in their Worcester shop. There is another like it in their Cleveland shop. Both are used in the forging of die blocks. The reverse side of the leaflet shows the interior of the pickling building at Worcester.

The F. Bissell Company, Toledo, Ohio, is sending out publication No. 117, which is a handbook of switchboards. This illustrates a variety of standard boards of some 35 types with capacities of 2500 amperes or less. These are furnished complete or in parts. Fuses, breakers, connections and other accessories are also listed.

The Model Heating Company, Philadelphia, is mailing a large folded card each month containing information of value to the operating engineer or workman which it is suggested be tacked up in a prominent place for the benefit of the employees. The eighteenth number tells how to determine the proper boiler capacity for a heating system and gives other useful information, such as calculating the weight of cast iron, how to prevent it from rusting, how to test the quality of iron, &c.

The Diamond Saw & Stamping Works, Buffalo, N. Y., has issued a circular on hack saw frames and blades for all purposes and inclosed with it are a circular concerning the Sterling emery wheel dresser and a blank which may be used for ordering goods.

The Patterson Tool & Supply Company, Dayton, Ohio, advertises a set of drawing instruments in a neat way. It is in the form of a folder which when opened out represents a plush lined leather instrument case with a full complement of drawing instruments, including two bow pens, large dividers, large compasses with detachable pencil and pen legs and extension, and a small spring dividers, and spring pen and pencil compasses. The name on the cover indicates the manufacturer, and the price is printed beneath.

R. O. Stetson, Greenfield, Mass., has recently issued catalogue D on the Stratton Brothers' improved spirit levels. A line of machinists' and carpenters' levels is shown in all grades and sizes and also a small brass pocket level. One of the most unique is an electric level for use in dark places, which has an electric lamp under the level vial and another over the plumb. The battery is contained in the body of the level.

The Triangle Protractor Company, Worcester, Mass., has sent out a folded mailing card sealed with stamp which when opened out shows a card which may be used in replying, where the former address becomes the returner's signature. The part of the card which is torn off contains a description of a 45-degree all celluloid triangle with a sliding bar protractor which can be read to 10 minutes and is reversible and invertible.

Frank B. Gilbreth, general contractor, Park Row Building, New York, has recently published two bulletins, one giving novel methods of constructing a modern power station for the Cambridge (Mass.) Electric Light Company. The bulletin is mostly full page half-tones showing the work in various stages of its progress and special features of the construction. The stack is 225 feet high and was erected complete in the remarkably short time of 14 days. The other bulletin is on the subject of rapid building construction, and shows views and drawings of various constructions which were undertaken by Mr. Gilbreth.

Sociology and business are happily blended at the works of the Weston Electrical Instrument Company, Newark, N. J. This company has prepared for distribution at the St. Louis World's Fair an attractively compiled pamphlet dealing with the Weston employees' club and social features in connection with the company. It would be impossible to go into details concerning their club, amusement provisions, restaurant, sanitary features, &c., but the account is an extremely interesting one and should be read by all employers. The success of the experiment indicates one very effective way of handling the labor question.

The Fort Wayne Electric Works, Fort Wayne, Ind., has issued bulletins Nos. 1056 and 1057, the first superseding No. 1031, which is on the subject of type A transformers, giving descriptions of all their parts and something concerning their regulation and efficiency. Tables of dimensions are appended. Bulletin No. 1057 deals with multi-phase revolving field belted generators. Their general construction and details of the parts are described and illustrated. There is also something concerning type AE rheostats, which serve the double purpose of regulating the alternator field and the exciter field with one resistance. This bulletin also contains tables of sizes and classifications of the multiphase revolving field alternators.

New York.

NEW YORK, October 5, 1904.

Pig Iron.—In the local market there have been no large sales, nor has there been any marked movement. In New England there has been further buying. We continue to quote \$14.75 to \$15 for No. 1 Northern Foundry, \$14 to \$14.50 for No. 2 Foundry, and \$12.75 to \$13 for Gray Forge, tidewater delivery. Tennessee and Alabama brands are \$13.25 to \$13.50 for No. 2 Foundry and \$12.75 to \$13 for No. 3 Foundry.

Steel Rails.—The only order of any consequence placed during the week is one for 1750 tons for a coal road. There are on the books of the mills about 350,000 tons of Steel Rails, heavy sections, which includes the balance of export orders not yet filled. This would carry the mills fairly well to the end of the year, with what current orders for small lots may come to hand. In the aggregate the latter business is rather heavier than is generally supposed. In Light Rails some very low figures have been made for export, but the domestic market is rather better.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company has secured a contract to furnish the Panama Canal Commission with about 4000 net tons of 6 to 16 inch Pipe at \$21.70 per ton, delivered. The daily newspapers erroneously stated this contract to have called for 42,000 tons. The general demand for Pipe continues as previously reported. The foundries are in receipt of a fair volume of business, which is stated to be excellent for the season. Carload lots are quoted at \$25 to \$25.50 per gross ton for 6 to 10 inch, and \$24 to \$25 for 12 inch, at tide-water.

Finished Iron and Steel.—Very little tonnage is now coming out, either in bridge work or in structural work for buildings. The contracts which are being placed are usually so small and competition on them is so sharp that the large fabricators are disposed to hold off and reserve their capacity for the time when more important work will be in the market, which is quite confidently expected to be toward the close of the year. The Plate trade shows but little improvement. The Bar trade is quiet, as consumers argue that no immediate advance in prices is to be expected and therefore no advantage is to be gained by making contracts running into the future. It is also surmised that prior to the recent formation of the Eastern Bar Iron Association a number of mills took orders at lower rates than those agreed upon. Quotations at tidewater are as follows: Beams, Channels, Angles and Zees, 1.54½c. to 1.80c.; Tees, 1.59½c. to 1.80c.; Bulb Angles and Deck Beams, 1.64½c. to 1.85c.; Sheared Plates, in carload lots, 1.54½c. to 1.65c. for Tank, 1.64½c. to 1.80c. for Flange, 1.74½c. to 1.90c. for Marine, and 1.74½c. to 2.50c. for Fire Box, according to specifications; Refined Bar Iron, 1.44½c. to 1.49½c.; Soft Steel Bars, 1.44½c. to 1.49½c.

Old Material.—Another lot of 2500 tons of heavy Relaying Rails was offered last week, and it is stated that fully 12,500 tons of such Rails are now seeking buyers in this territory. Little disposition is shown, however, to take them off the hands of the holders. The general market for Old Material is fairly strong and some good lots have been sold since last report. Among these were 1000 tons of Stove Plate, 500 tons of Heavy Cast Scrap and 700 tons of Re-rolling Steel Rails. Old Car Wheels are looking up at last and are now in fairly good demand. Dealers state that nearly every class of Old Material can now be sold at outside figures. Quotations per gross ton in New York and vicinity are approximately as follows:

Old Iron Rails.....	\$14.00 to \$15.00
Old Steel Rails, re-rolling lengths.....	11.50 to 12.50
Old Steel Rails, short pieces.....	11.00 to 11.50
Relaying Rails.....	16.00 to 17.00
Old Car Wheels.....	11.00 to 11.50
Old Iron Car Axles.....	15.50 to 16.00
Old Steel Car Axles.....	14.00 to 14.50
Heavy Melting Steel Scrap.....	11.00 to 11.50
No. 1 Railroad Wrought Scrap.....	12.50 to 13.00
Iron Track Scrap.....	11.00 to 11.50
Wrought Pipe.....	8.50 to 9.00
Ordinary Light Iron.....	6.00 to 6.50
Cast Borings.....	5.00 to 5.50
Wrought Turnings.....	7.00 to 7.50
No. 1 Machinery Cast.....	10.75 to 11.00
Stove Plate.....	8.50 to 9.00

Crocker Brothers, 99 John street, New York, announce that they have assumed the sole agency for the sale of the product of the Bellefonte Furnace Company, whose well-known brand of Bellefonte Foundry Pig Iron will be manufactured as in the past under the personal supervision of J. W. Gephart.

Judge Freemont Alford of the Marion County Criminal Court, Indianapolis, Ind., fined two strikers' pickets \$300 and \$250, respectively, and gave them 180 days each in the workhouse for assaulting a fellow workman who did not choose to go on a strike with them, and in doing

so made the following caustic comment: "I have given you as heavy a penalty as the law would allow, and I would like to make it greater. Cases like these should be tried the morning after the crime is committed. Men in this country have their rights, the right to work and to quit work. The law gives unions the right to quit in a body and no employer can compel the men to go back to work. On the other hand, no man has the right to compel another to quit work against his will. Under the law, men who do not belong to unions have equal rights with those who do. No legislature could change this, for in this country men have the right of life and liberty."

Metal Market.

NEW YORK, October 5, 1904.

Pig Tin.—In view of the favorable monthly statistics made public on the 3d inst. the market gathered considerable firmness on Monday, and prices have been climbing ever since. The manipulators at London anticipated the showing made by the statisticians and had an easy time of increasing the momentum of the upward movement of prices, which had been gradually stiffening for a week or more, as soon as it was shown just how small a quantity of the metal was on hand here and in transit. In this market prices went up sympathetically, but in a much slighter degree. Here the advance amounted to but 40c., while in London prices were pushed up £1 10s. The movement was entirely speculative, however, as consumers exhibited an inclination to wait until the smoke had cleared before coming into the market. At the close to-day prices here named 28.25c. to 28.50c. for spot and October deliveries, and 28.12½c. to 28.37½c. for November delivery. The London market closed firm at £129 5s. for spot and £129 for futures. From the monthly statistics compiled by C. Mayer, secretary of the New York Metal Exchange, we take the following:

Deliveries into consumption were fair, amounting to 2700 tons. The total for the nine months of this year shows a decrease of 3300 tons, compared with the same period of last year.

The combined deliveries of London and Holland for September were 604 tons smaller than last year. For the nine months of this year they show an increase of 1398 tons, compared with the same period of last year.

Shipments from the Straits for September were 183 tons smaller than for the same month of last year. For the nine months of this year they are 1109 tons more than for the same period of last year.

Australia shipped 120 tons less than in September of last year. The total decrease for the nine months of this year amounts to 125 tons, compared with the same period of last year.

The total visible supply on September 30 is 4090 tons below that of September 30 of last year.

	Tons.
Arrivals at the Atlantic ports amounted to.....	1,855
Total arrivals since January 1, 1904.....	27,444
Of which from Straits by direct steamers.....	9,660
Of which from United Kingdom.....	16,181
Of which from Holland.....	422
Of which from European Continent.....	1,181
The deliveries for September we figure as.....	2,700
Total deliveries since January, 1904.....	27,400
Deliveries same period in 1903.....	30,700
The shipments from Straits amounted to.....	4,282
Against previous month.....	4,815
Against September, 1903.....	4,465
Australia shipped.....	325
Against previous month.....	375
Against September, 1903.....	445
Statistics for the United States—Pacific ports excluded—	
September 30, show as follows:	
Stocks, including on dock and arrivals.....	1,415
Afloat.....	1,920
Total.....	3,335

The total statistics for Europe and the United States show:

	Tons.
Total visible supply, September 30, 1904.....	13,159
Against visible supply August 31, 1904.....	12,480
Against visible supply September 30, 1903.....	17,249
Against visible supply December 31, 1903.....	14,274

Copper.—The market is firm and slightly higher as to price. It is reported that consumers are coming into the market a little better. The inquiries, it is said, indicate that in some cases large manufacturers, who have been drawing from reserve supplies, have exhausted them and are now forced to enter the market, while other consumers who have been buying from hand to mouth are specifying more liberally. Reports from the Naugatuck Valley state that the Brass mills are showing a little more activity. The heavy exportations continue. Quotations made on 'Change at present are: Lake, 12.87½c. to 13c.; Electrolytic, 12.75c. to 12.87½c.; Casting, 12.62½c. to 12.75c. The London market has advanced 10 shillings, to £58 17s. 6d. for spot and £58 18s. 9d. for futures. Best Selected has advanced similarly to £62 5s. The monthly statistics show that the exportation for the month of September totaled 20,469 tons.

Pig Lead.—The market is quiet and unchanged. The American Smelting & Refining Company is still quoting on a basis of 4.20c. for "shipment" Desilverized in 50-ton lots. Strictly spot Lead in small quantities is quoted here 4.20c.

to 4.30c., while St. Louis telegraphs 4.12½c. The London market is higher at £11 18s. 9d.

Spelter.—The market is quiet and unchanged as to prices quoted in this market. Spot is quoted here to-day 5.10c. to 5.20c., and St. Louis is a shade easier and is now quoting 4.95c. London is higher, quoting £22 15s.

Antimony.—Demand is light and the market is easier. Cookson's and Hallett's are quoted at 7c. and other grades at 6c.

Nickel.—The usual amount of business is passing and prices are steady, large lots being quoted at 40c. to 45c. and smaller quantities at 50c. to 60c.

Quicksilver.—The market has declined. Flasks of 76½ lbs. were quoted to-day at \$40. London is unchanged at £7 15s.

Tin Plate.—Nothing new has developed in the situation as regards Tin Plate. The market is still quiet and unchanged. A fair amount of business is passing, as is usual at this time of the year. The American Sheet & Tin Plate Company is quoting \$3.30 per box, Pittsburgh, for 14 x 20 100-lb. Coke Plates, making the price \$3.49, delivered in New York. The Welsh market is unchanged at 11 shillings 7½ pence.

Iron and Industrial Stocks.

NEW YORK, October 5, 1904.

United States Steel securities played a very important part in the stock market during the week under review. For several days these stocks were the center of interest, and their strength caused the entire list to move upward. The rumored revival of the bond conversion scheme has been strongly denied by prominent interests identified with the corporation, and it is now stated that the great advance is simply due to the higher standing of the corporation among large capitalists secured by its earnings during the recent dull period. The range of prices on the common stock during the week was from 17½ to 19½, on the preferred stock from 71½ to 76½, and on the new 5's from 82½ to 84. Other industrial stocks showed considerable strength, prominent among these being the Can stocks, the rise in which is stated to be due to a belief in an early financial reorganization of the company by which the capitalization will be reduced. The common stock rose from 5½ to 7½, and the preferred from 46¼ to 49¼. Car & Foundry common rose from 22½ to 24; Locomotive common from 25½ to 27½; Colorado Fuel from 34½ to 37; Crucible Steel common from 4½ to 6½; Crucible Steel preferred from 39½ to 41; Pressed Steel common from 32½ to 35½; Republic common from 8¼ to 11¼; Republic preferred from 45 to 53¼; Sloss-Sheffield common from 40 to 42½; Tennessee Coal from 47¼ to 49¼; United States Cast Iron Pipe from 58½ to 60. The market on these stocks was somewhat lower on Wednesday. The last transactions in active stocks up to 1.30 p.m. on Wednesday were made at the following prices: Can common 7½, preferred 49¼; Car & Foundry common 23, preferred 81½; Locomotive common 26½, preferred 95¼; Colorado Fuel 36½; Pressed Steel common 34, preferred 80; Railway Spring common 23½, preferred 80¼; Republic common 10¼, preferred 51½; Sloss-Sheffield common 41½, preferred 89¼; Tennessee Coal 49½; United States Steel common 18½, preferred 75, new 5's 83½.

A meeting of the stockholders of the Pittsburgh Stove & Range Company will be held November 21 to vote on a proposition to issue \$500,000 bonds. These bonds will be used to retire the company's \$1,000,000 of preferred stock at the rate of \$50 in bonds for each \$100 in stock. The bonds will be 5 per cent., and the plan will give the shareholders bonds bearing 2½ per cent. interest on the par value of their stock instead of the present 7 per cent. preferred stock, which is cumulative, but which has paid no dividend since 1901. On each share of stock 28 per cent. of back dividend, or \$14 a share, will have piled up by the close of this year. The stock sold last week at 13, a basis of, say, \$27 a share value, including the dividends. The company is understood to have bought in over \$100,000 of its preferred stock, so that something over \$50,000 of the proposed bonds would go into the treasury.

Stockholders of the Pittsburgh Coal & Gas Company, Pittsburgh, have received circular letters announcing a new bond issue. The proposed issue totals \$2,600,000, of which \$1,600,000 is to be used to refund the outstanding short time 6 per cent. bonds. The new bonds are to run 13 years, and it is understood that the entire issue has already been underwritten. The special meeting of stockholders for the purpose of authorizing the issue is to be held on October 11. In the letter it is stated that since the organization of the company it has acquired additional leases amounting to 123,847 acres, and that it now owns 537 producing oil and gas wells.

The American Car & Foundry Company's statement for four months ending August 31 shows that the net earnings were smaller than those of the same period a year ago by about \$760,000. The surplus a year ago was arrived at after allowing for a disbursement of \$300,000 on the com-

mon stock, payment on which was suspended this year. Following are the comparative figures for the four months:

	1904.	1903.	Decrease.
Net for four months.....	\$817,544	\$1,578,073	\$760,529
Preferred dividend.....	525,000	525,000	
Common dividend.....		300,000	300,000
Total dividend.....	\$525,000	\$825,000	\$300,000
Surplus.....	\$292,544	\$753,073	\$460,529

Dividends.—American Car & Foundry Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable November 1.

International Power Company has declared a semiannual dividend of 3 per cent. on the preferred stock, payable October 15.

Nicholson File Company has declared a cash dividend of \$50 a share on the old stock, payable October 11. The company recently increased its capital stock to \$5,000,000.

The Rock Run Fuel Gas Company has declared a dividend of 1¼ per cent. on the preferred stock.

Central Coal & Coke Company has declared the regular quarterly dividends of 1½ per cent. on the common and 1¼ per cent. on the preferred stock, payable October 15.

Ohio Fuel & Supply Company has declared the usual quarterly dividend of 2½ per cent., payable October 15.

The Manufacturers' Light & Heat Company, Pittsburgh, has declared the usual quarterly dividend of 1½ per cent., payable October 20.

The Westinghouse Machine Company, Pittsburgh, has declared a quarterly dividend of 2½ per cent., payable October 12.

Vanadium Steel.

A paper read by M. Léon Guillet before the Académie des Sciences, Paris, gives the results of investigations upon two series of vanadium steel, the first containing about 0.20 per cent. of carbon, and the second 0.80 per cent. In each series the proportion of vanadium was increased from 0 to 10 per cent., especial attention being given to those containing 3 per cent. of vanadium, as being of the greatest industrial importance.

Three groups may be distinguished in considering vanadium steel: 1. Steel presenting the same structure as carbon steel. 2. Steel containing pearlite and vanadium carbide. 3. Steel in which all the carbon appears in the latter form.

The mechanical properties may be stated broadly as follows: Steel of the first and second groups shows a much higher ultimate strength and elastic limit than ordinary steel of the same carbon content; the elongation and reduction of area are medium, and they are much harder and more brittle than carbon steels. Thus, a steel containing 0.131 carbon, and 0.60 vanadium showed an ultimate resistance of 98,000 pounds, and an elastic limit of 78,000 pounds. With a steel of 0.112 carbon and 1.04 per cent. vanadium the ultimate strength rose to 123,000 pounds, with an elastic limit of 107,000 pounds per square inch, the elongation being from 10 to 12 per cent. Steel of the third group, containing 3 per cent. and more of vanadium, shows very low ultimate strength and elastic limit; the elongation becomes high, while at the same time it is very brittle.

In general, vanadium steel may be divided into three distinct groups, one of these holding an intermediate position between the other two. Each of these groups may be characterized by its mechanical properties and those containing the special constituent present very remarkable properties. The experiments show that industrial applications may be expected only of steel containing less than 7 per cent. of vanadium, and hence it is upon these alloys that further experiments should be directed.

The brittleness of the vanadium steel apparently prevents it from being used for the production of cutting tools, for which it would otherwise appear to be well adapted, but it is possible that this property may be modified by the addition of nickel.

A New Beam Mill at South Chicago.—The plans have been completed for a new beam mill at the South Chicago works of the Illinois Steel Company. The mill is to roll the range of 7 to 15 inch beams. The larger sizes will continue to be delivered from Homestead. The mill will probably be a 33-inch mill. The improvement will be taken in hand at once and contracts will probably be placed at an early date.

HARDWARE.

IN the following pages Hardware merchants and manufacturers will find much that cannot fail to be suggestive and stimulating. In one communication a prominent manufacturer discusses with clearness and force the position and influence of the catalogue house and the way in which it is to be treated by the trade. For the benefit of the retail merchants of the country our correspondent points out with exceptional frankness and directness that the merchants themselves are to find the remedy for the new competition as they put away antiquated methods and with enterprise and modern ways of doing things cope energetically with the mail order business of the great cities. If some of our readers are inclined to feel aggrieved at the outspoken manner in which the conduct of some Hardware concerns is described and condemned, few will deny that there is ground for what our correspondent says and force in his argument. Indeed, the trade is more and more realizing that the practical lesson to be derived from the success of the catalogue houses and their troublesome place in the market is the duty—rather the necessity—of new alertness and enterprise on the part of the local merchants, some of whose business they are capturing. This suggestion should be reiterated until it is brought to the attention of every merchant who has brains or energy enough to recognize the principle and act upon it. Fortunately, many are doing this, and a new spirit is taking possession of the trade.

As enforcing a similar lesson, and at the same time giving practical suggestions that cannot but be stimulating, we also give extracts from a budget of letters in which the writers discuss the question as to the advisability of GOING OUT AFTER BUSINESS. It is to be noted that there is practical unanimity among our correspondents that this is to be done to a greater or less extent. The letters printed make it evident that some find it advantageous to do this much more thoroughly and systematically than it is usually done. It being conceded that some outside activity, some coming in contact with customers outside the store, some personal canvassing for trade, is desirable in connection with practically every establishment, it becomes a question which each merchant must settle for himself as to the manner in which such outside work is to be carried on and the extent to which it will be made a regular part of his business. Circumstances will do much, and the personality of the merchant will do more, to determine the course to be pursued in this regard. The fact that this going after business is to be regarded as having some place in the plans and efforts of the wise and enterprising merchant brings up the question squarely before each merchant as to how his practice in this matches his obligations and opportunities. In this suggestion there is something stimulating for enterprising merchants.

While "A Manufacturer's Comments on the Catalogue House" are intended primarily for the retail merchant, there is in them for manufacturers and jobbers something suggestive, though said incidentally. In connection with the admission that the catalogue house is a legitimate method of distribution, our correspondent utters a caution as to the dangers which might attend anything like a boycott of manufacturers whose goods are handled by such houses, incidentally intimating that drastic measures will bring disaster to the Hardwareman. He probably has in mind all the distributors of the goods, both

wholesale and retail. This is an interesting phase of the problem into which our correspondent does not go, but simply throws out the suggestion and leaves it to the trade to think about.

Condition of Trade.

The orders which the jobbing trade are sending in to manufacturers are for the most part for goods to complete their assortments, and indicate that stocks in general are sufficient for present requirements. The demand, however, in some sections is so good that they are becoming depleted in certain lines. The purchase of relatively small lots is facilitated by the fact that manufacturers generally can execute orders promptly, and is also encouraged by the tone of the market, in which there is no special strength. In fact, while there is no marked tendency toward lower prices, a good many goods are offered at slight concessions from prices recently held pretty firmly. This is the natural result of the somewhat moderated demand and of the tone of the Iron market. These influences tend to make the trade conservative. At the same time a good feeling prevails and anticipations are freely expressed of an excellent business in the near future. The reports from the crops, which are more favorable than a short time ago, contribute to this confidence. Season goods are moving freely under the spur of colder weather, and this class of products is a good part of most assorted orders. Holiday goods, too, are in active request. The probability is that more Hardware merchants than ever will this year make their holiday trade a feature of their business, and to this end are adding liberally to their assortments.

Chicago.

It is worth while here, at the opening of the fourth quarter of the year, and the early weeks of autumn, to discuss somewhat in detail Hardware conditions as they exist in Western territory. Business in general may be epitomized as ranging from good to excellent, the trade being very evenly distributed geographically, with no single lines of goods standing out in bold relief as exceptionally active. A large demand for Nails and Wire products is in evidence. This demand and the urgent request for delivery which accompanies it indicate, as we have before stated, that local stocks have been extremely low. Now that dealers are satisfied that prices are as low as they are likely to be, a good buying movement has set in. The cutting in prices mentioned in last week's issue is confined largely to the South and Southwest, where Eastern producers are naming special rates in order to compete with large producers at Birmingham and Pueblo. Demand for Coal Hods, Scoops, Pipe, Elbows, Stove Boards and kindred goods is developing rather earlier than usual, and in good volume. An exceptional trade is reported by some jobbers in Oil Heaters. Corn Knives and Huskers are in such demand that jobbers whose stocks were so large as to cause them fear some weeks ago have been compelled to reorder from the makers by wire. A good business is developing in Guns and Ammunition, particularly in the Missouri River territory. Cutlery is quite active. Demand for Steel Goods, such as Manure and Potato Forks, is reported to be better than usual. A large early trade is developing in Shovels, but prices are badly demoralized, and competition between makers is unchecked by any association. Hatchet and small Axe makers have recently surprised the jobbing trade not altogether pleasantly by cutting the official prices from the old discounts of 40 and 5 to jobbers to 50 per cent. Their circulars state that this 50 per cent. discount will hold only to November 15, at which time the price will be raised to the discount of 40 and 12½ per cent. The Chisel Makers' Association is evidently badly demoralized, as prices are weakening almost daily, and keen price competition is being indulged in by makers. The same is true of Picks, Mattocks, Wedges

and Crowbars, in which prices are low and weak. Makers of Barn Door Hangers have been holding a meeting in Chicago this week, but the result of the meeting is not yet announced. The association was once an important factor, and this new meeting will decide whether it will pay to place it again on a practical working basis or to abandon it. Coffee Mills have been advanced in price all along the line, the advances ranging from 5 to 45 per cent. over the old price. Makers of Axe and Hatchet Handles have been promulgating a new list dated September 10, which advances the list prices about 50 per cent. This advance in list prices will be accompanied by a modification of discounts, separate discounts being named for distinct lines. The Orr & Lockett Hardware Company secured the Hardware contract for the Rector office building, aggregating about \$7000. Sargent Hardware will be supplied.

Philadelphia.

SUPPLER HARDWARE COMPANY.—The cause of your not having our semimonthly letter to *The Iron Age*, giving our view of the condition of trade, during the last few weeks, has been owing to the absence from the house of the writer. It is quite safe to say trade has improved regularly (which should be satisfactory) since our last letter, and the views expressed early in the season, in which we took an optimistic side on the question of trade, present indications show were well taken. The textile manufacturers have largely resumed operations, the strikes throughout the country have largely subsided and our railroads have largely taken back their working force. Manufacturers have not, as a rule, piled up stock, but their product has been largely taken. The weather conditions have been generally favorable to growing crops and banks are amply provided with funds for moving the same, and from present appearances we feel the coming six weeks will not suffer from the Presidential contest, which is now progressing in a calm and dignified manner, and we cannot see that it is having any demoralizing effect on trade conditions. Prices remain without any material change.

The year that has just passed has shown that the disposition on the part of the buyers (and the same naturally applies to the consumers) has been for a better grade of Hardware. This is especially applicable to Builders' Hardware, and there is every evidence of doing away with the cheapest grade of Rim Locks and getting a better and higher grade of Mortise Locks and Trimmings. But, possibly, nothing has shown this to a greater extent than the sales of better grades of Lawn Mowers. The fad for the cheapest Lawn Mower producible has amazingly subsided. We do not mean to infer by this that a person who has a few rods of ground has jumped from the poorest to the highest priced Lawn Mower; but the demand for Lawn Mowers that will do more effective work for the ordinary lawn has increased, and it has come to a point that a man who has a fair sized lawn which he desires to keep in good condition ignores the cheapest grade, which cannot be expected to do efficient work, and raises the standard as he would from a 10-cent Pocket Knife to a \$1 or \$2 Knife, or as he would from the poorest Table Knife to one of superior quality. The average man who has use for a Lawn Mower and desires a beautiful and well kept lawn realizes he cannot secure it with a poor article, and therefore there has never been a year when high grade Lawn Mowers have been in such active demand as this year, and the sale of high grade machines has largely increased during the past two or three years.

A family can live in a cheaply built frame house, with a 15-cent Rim Lock to secure the door, depending upon a Stove to protect them against the winter blasts, and a Galvanized Bucket for the daily bath, but the comforts of life can only be secured by better conditions and surroundings, and this has been made possible in our country through the vastly improved conditions of the American people during the past few years, extending from the ordinary day laborers to those of greater experience in such work as secures them still higher wages, and then to the skilled mechanic, as well as persons engaged in various clerical occupations. With the improved condi-

tion of mankind in general goes the natural desire for greater comforts of life.

Baltimore.

CARLIN & FULTON.—During the last three months this city has enjoyed the visits from the South of possibly the largest number of buyers that have ever patronized this market, and all branches of trade have had a most excellent season, fully equal to, if not exceeding, in volume the business of any preceding year. The influx of merchants from the cotton States, who are always first in the market, is now about over, and this month we are greeting our friends from the sections more adjacent.

There is no disputing the fact that agriculture is the basis of our nation's commercial prosperity, and dependent on the greatness of its crops and the prices obtained for them in the markets of the world are nearly all other branches of industry. Most fortunate, therefore, is it that cotton, while not at the abnormal figures of last winter, is still bringing most remunerative prices, the benefits of which are going directly to the farmer, instead of, as in former years, to the factor or speculator only. Tobacco, which in some sections a year ago brought almost nothing, this year by a reduction of the acreage has been brought up to a paying basis. High prices for wheat, corn and all other agricultural products are doing their share toward refuting the pessimism attached to the business outlook of a Presidential year.

Locally, the rebuilding of so large a portion of our business section, destroyed in the great fire of February; the opening, regrading and widening of streets in the burnt area; the construction of new wharves and docks and storage warehouses along so large a portion of our water front, all involving the outlay of millions of dollars, requiring an immense amount of material, and giving employment to many thousands of laborers, artisans and mechanics in the various trades, are making this city a perfect beehive of industry. While bank clearings are always indicative of the amount of business done in any community, they include the transactions of the stock exchanges, which are greater or less, according to the activity of speculation in the stock market, and are not as good a criterion of actual business in commerce or manufacturing as is shown by the bank deposits, by the statistics of railroad earnings, or the reports of the custom houses at our ports of entry.

While during the last eight months the bank clearings for 1904 throughout the entire country, as compared with 1903, show an average decline of 11.14 per cent., Baltimore's percentage of this decline is but 9.48 per cent., while for nine months it is about 8.6 per cent. Our local bank deposits are larger than before the great fire of February and our custom house shows that our port is still holding its prominence as a great factor in the commerce of the world. We mention these facts as showing the condition of trade from our point of view and we hope that all other sections have had as pleasant an experience this season.

Now as to the condition of the Hardware market, the prices of Nails and Wire have for some reason dropped to the lowest point touched for several years, and yet it seems paradoxical that with a reduced price for its products and, as is stated, a lessened demand for same, the securities of the "leading interest" should show such an appreciation in value in the stock market as is evidenced by the daily quotations for same. Perhaps Wall Street is discounting future advances in prices and greatly improved business conditions in those lines.

The Axe and Edge Tool manufacturers seem to feel that their association is founded on a rock, for they are building higher and higher and are announcing the probabilities of still higher figures for January next. The new prices of the American Fork & Hoe Company are also announced for the coming year and show its confidence in the stability of prices. On the other hand, there have been some reductions, which are, perhaps, in keeping with the reduced cost of raw material, and which need the inspiration of some organizer or commissioner to restore the old figures, which are necessary to the payment of satisfactory dividends to stockholders.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The market is marked by steadiness. There are few changes in price. Such as are made are apparently rather more with the view of exciting some transient interest in the article rather than designed to effect anything permanent or significant. A slight variation from any source has the effect to divert business for a short time, but it is, as a matter of course, soon equalized. Every one seems fairly satisfied with the business in sight. The high price of farm products which go to sustain life in the cities bears, undoubtedly, heavily and unhappily on the people of slender means and who depend on their daily wage for sustenance; but these matters soon adjust themselves, especially when the demand for labor is as good as it is at present. No one that is able bodied and willing need be out of a job if he wants one now.

Even Chicago is passing through an unwonted state of quiescence, which we hope will last for some time. The dramatic scenes of violence sure to be enacted there in strike periods demoralize the rest of the Western country, which takes its cue from that great center of wealth and enterprise. When stabbing and shooting are going on unchecked in Chicago it is difficult enough to hold the hoodlum element down in other nearby places. In the rural districts, however, peace and prosperity prevail, and these have been so prosperous for several years that there is quite a tide turning from the cities to the country. Better wages and better living are to be had there than ever before.

Cleveland.

THE W. BINGHAM COMPANY.—The general Hardware trade in this section has been quite satisfactory during the last 60 days, and we are now arriving at a time of the year when there is a larger volume of business being done on account of our customers sorting up very liberally for fall business. Orders are now coming in oftener and for larger quantities of goods. A very large quantity of Nails and Wire has gone forward in the last 60 days. Just at present the demand is unusually large for these commodities.

Prices for the most part are steady and firm, and the disposition of some to cut prices to make sales is wearing away. The retailer realizes that the principal question with him when he orders goods is his ability to obtain same, and he is not looking for somebody to cut the price before he buys, but wants the goods. There has been a lot of senseless cutting in prices on some staple and fall goods, but as the demand increases prices are becoming more and more steady. Many of the jobbers are working overtime to fill their orders for miscellaneous goods. On the whole, general business is quite satisfactory.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The Hardware trade in this section for the past ten days has not been quite as active as it was at the same period of last year. This inactivity has been brought about, we think, by the dry, hot weather which has prevailed for more than 30 days in this section. The ground has become so dry and hard that fall plowing has been almost discontinued; entirely so in some sections. We have observed that when the agriculturist cannot work he will not spend money. We have no doubt that with the breaking of the drought and cooler weather the purse strings will be loosened and the retail merchant be made happy.

Although the drought set in very late, it has to some extent injured the crops. Late corn, hay and, in some sections, the cotton crops have been injured, but none of them to any very great extent. We will gather a good crop, and as the price of farm products is high, we have every reason to believe that the fall trade will be above the average. The farmers in this section are nearer out of debt than they have been for years, and the retail merchants are rather prompt in paying their bills. The future prospects of business are quite favorable.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—We have not yet been visited by Mr. Jack Frost, therefore, the

corn crop in this territory has had ample time to mature. After a series of vibrations, as a result of hot and cold chills in regard to the crops, we have settled down to fall business, realizing the average crop condition is very satisfactory and believing there will be a good fall and spring business in the large territory tributary to this city.

Our business in September increased considerably over last year. Business has been late. Our usually heavy August business came in September. We expect a good October, and, in fact, see no reason why business should not be good for the rest of this year.

In the recent death of John Cantwell this city lost a man who has been a prominent figure in the Hardware trade for a generation past. Mr. Cantwell enjoyed the reputation of being one of the best posted Hardwaremen in the West. He was a man of a kindly and gentle nature and his host of friends in the trade will learn of his death with deep sorrow.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—The business situation in Omaha and surrounding territory has registered a decided improvement since our last report. The strike of the packing house employees has been arranged. Consequently, stock raisers and shippers generally can re-enter the field of business in their regular way, from which they have suffered a complete shut-off for several weeks. This of itself puts a large amount of money into circulation again. During the cool weather of two weeks since the outlook appeared gloomy for the ripening corn, but since that time warm and pleasant weather has appeared and produced a decided change in the conditions, and it now becomes an assured fact that there will be one of the largest crops of corn ever harvested in Nebraska and Iowa. These conditions, together with the substantial values obtained for all the productions of the farm, have had a stimulating influence on general trade, which we can now report as being very satisfactory, indeed.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—Clearings showing increase of 192-10 per cent. last week, with wheat going East by rail instead of seeking its usual outlet via coast ports, indicate that business of some nature is being done. There is certainly no considerable movement of Hardware, as trade in this line is unusually light for the season. The lumber market as yet shows no improvement. Demand is at a very low ebb. Hops, of all our products, excepting wheat, is the only one to show strength, and that will return a big profit to the producers for the season. Collections are slow in most sections.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—Business conditions continue good. The weather is not entirely favorable, but crops are being saved. Collections have started satisfactorily.

NOTES ON PRICES.

Wire Nails.—The demand, while in good volume, is not up to the capacity of the mills, and is largely confined to present requirements, due in part to the fact that manufacturers are limiting the time on contract orders. Competitive prices are still in evidence in the West and Southwest, while the Eastern market is firm at official quotations. Carload prices are accessible to carload buyers, either jobbers or retailers. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Carload lots.....	\$1.60
Less than carload lots.....	1.65

Coated Wire Nails, as a result of an increased number of manufacturers, have been brought into more prominence. These Nails are used most largely by manufacturers of packing boxes, cases, crates, &c., although they are found well adapted to some other uses. Until recently these Nails were quoted on a Pittsburgh basis, in the same manner as Wire Nails are, but owing to Western competi-

tion they are generally quoted either f.o.b. at Western factory or at buyer's freight station. From the same cause prices to Western buyers are lower than to those in the East, competition being quite animated. Quotations are as follows: Carloads on dock, New York, \$1.65, base, per keg; less than carloads on dock, \$1.70; small lots from store, \$1.75. Western quotations are on the basis of \$1.45 per keg, f.o.b. Chicago.

New York.—The amount of business in Wire Nails done by jobbers at this point was entirely satisfactory during the month of September. This included city trade and orders from nearby points. Out of town merchants have in some instances ordered repeatedly and in substantial quantities. The market is firm at quoted prices. The following are New York quotations: Single carloads, \$1.79½; small lots from store, \$1.85 to \$1.90.

Chicago, by Telegraph.—Demand for Wire Nails continues to be good, but the tonnage booked is not so large that mills would not like to see it larger. Buying is limited largely to current requirements, both because the mills are unwilling to name current prices far ahead and because there is little disposition on the part of buyers to ask for extended deliveries. Prices are unchanged. Prices of the leading producer are: In carload lots to jobbers, \$1.75; to retailers, \$1.80; less than car lots, \$2 per keg, Chicago. From these prices a confidential rebate is given to jobbers to permit them to compete with a large independent, who gives the above prices direct to the retailer or consumer in car lots.

Pittsburgh.—A good volume of business is reported in Wire Nails, the local mills having entered considerable tonnage for shipment within 30 days from date of contract. The future course of the market as to prices is hard to determine, some of the leading jobbers believing there will be a reduction in prices, while others anticipate an advance in the near future. However, the tone of the market is firm, official prices being well sustained, except to a few points in the extreme West and South, which are regarded as disputed territory between the leading Wire Nail interests, with the result that competition is keen for trade in those sections and some shading is being done. A slight car shortage has developed in this district, which is interfering with shipments to some extent. We quote Wire Nails as follows: In carload and larger lots to jobbers, \$1.60; carload lots to retailers, \$1.65; less than carload lots to jobbers, \$1.65; less than carload lots to retailers, \$1.75.

Cut Nails.—The market is characterized by a steady but moderate demand, and while association quotations represent the market in a general way, prices are sometimes shaded about 5 cents, or slightly more, to large buyers. Quotations are as follows: \$1.60 and \$1.65 for carload lots and less than carload lots, respectively, f.o.b. Pittsburgh. In the East Iron Nails are quoted at the same price as Steel Nails, but in territory west of Pittsburgh Iron Nails are quoted in carload lots, f.o.b. Pittsburgh, at \$1.65, with an advance of 10 cents in less than carload lots.

New York.—A fair business, in comparison with Wire Nails, was done at this point during the month. The local market remains firm. Quotations are as follows: Carloads on dock, \$1.74; less than carloads on dock, \$1.79; small lots from store, \$1.85.

Chicago, by Telegraph.—There is no change in either situation or prices as far as can be learned in this market. The Cut Nail has recently lost much of the ground that it gained some weeks ago, when prices on that commodity were considerably lower than on Wire Nails. Chicago prices on Steel Cut Nails, car lots, range from \$1.75 to \$1.80. Large cash buyers are able to better the minimum price by about 5 cents. The strictly Puddled Iron Nail commands a premium above steel.

Pittsburgh.—Demand for Nails is more active than for some time, but the trade continues to place orders for early shipment only, not caring to contract ahead. We quote Cut Nails at \$1.60 in carloads and \$1.65 in less than carloads, f.o.b. Pittsburgh, with freight to destination added. To the trade who buy in large lots concessions of about 5c. a keg are made on above prices.

Barb Wire.—The largest call is from the Western and Southern sections of the country, and has reached large proportions. Demand at the East continues in moderate volume. The principal makers are not accepting orders for more than 30 days ahead. The regular schedule of prices is as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.75	\$2.05
Retailers, carload lots.....	1.80	2.10
Retailers, less than carload lots.....	1.90	2.20

Chicago, by Telegraph.—The fact that winter lingered in the lap of spring prevented farmers doing their usual amount of fencing last spring, and the consequence is that this fall a larger mileage of Barb Wire is being strung than usual. The demand is correspondingly great, and there are indications that this may prove to be a record breaking season in sales and consumption of Barb Wire. From the Southwest the demand is particularly large in volume. We quote: Jobbers, car lots, Painted Wire, \$1.90; Galvanized, \$2.20; retailers, car lots, Painted, \$1.95; Galvanized, \$2.25; less than car lots, Painted, \$2.05; Galvanized, \$2.35; Staples, \$1.85; Galvanized Staples, \$2.15. The jobbers' prices are named to large retailers by certain independent mills.

Pittsburgh.—Demand for Barb Wire is only fair, the trade placing some orders and for early shipment. The leading mills continue the policy of entering orders only for shipment within 30 days from date of contract. Prices are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.75	\$2.05
Retailers, carload lots.....	1.80	2.10
Retailers, less than carload lots.....	1.90	2.20

Smooth Fence Wire.—Demand from manufacturers of Fencing is large and is supposed to represent only current requirements, as well as orders designed for other uses. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	\$1.45
Retailers, carloads	1.50

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago, by Telegraph.—While it is believed that Fence manufacturers are buying only their current requirements in Wire, their purchases in the aggregate are very large, because of the unusual demand for Fencing this fall. Wire also enters into such a wide diversification of industries that the demand never ceases. However, it is evident that the present large movement of this product represents only current consumption. Prices are unchanged, on the basis of \$1.45, Pittsburgh, which, with the arbitrary 15 cents differential, makes the Chicago price on Nos. 6 to 9, Annealed, \$1.60; Galvanized, \$1.90, in car lots, with the usual extra for lighter gauges.

Pittsburgh.—Tonnage is reported quite heavy and the mills are making large shipments, continuing the policy of entering orders only for shipment within 30 days from date of contract. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.45
Retailers, carloads.....	1.50
Less than carloads.....	1.60

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances.

Coffee Mills.—Manufacturers of Box and Side Coffee Mills are working in harmony and endeavoring to agree upon uniform list prices. Meanwhile quotations have been advanced and a firm tone characterizes the market.

Chisels.—There has recently been a good deal of conference between the various manufacturers of Chisels with a view to forming a pool, but up to this time they have not all been disposed to take this step. The matter, however, has not been abandoned, and is likely to be de-

terminated one way or the other in the near future. It is intimated that there is a possibility that a strong organization may be formed even if all the manufacturers are not parties to it. The existing condition of the market is unsatisfactory and prices are irregular and low.

Wire Cloth.—While the price for Screen Wire Cloth for next season is not yet definitely determined, a good many orders are being placed by the larger houses. The general impression is that the price will not be materially different from last year. The fact that the Wire which enters into these goods is under strong control tends to give steadiness to the market for the Cloth.

Steel Goods.—The American Fork & Hoe Company, Cleveland, Ohio, has issued a catalogue which represents the products of its various constituent companies. In doing this there has been a revision of the list and new list prices are announced. The company has changed its method of quotation, inasmuch as its former printed discounts, which were regarded as the base or retail prices, and beyond which the jobbers were given extras, have been abandoned. The company has now adopted the plan of having no printed discounts, but making written discounts to each jobber, leaving it for the jobbing trade to add such margin as in their judgment they deem best, and to handle the Steel Goods business as they do that of many other articles in their line.

Snaths and Cradles.—The list for Snaths and Cradles for next season is substantially the same as for last season, but a different arrangement of discounts is announced as indicated by the following prices for the smaller quantities of goods:

	Discount.
Grain Cradles, less than 6 dozen.....	40 and 12½%
Grass Snaths, less than 20 dozen.....	45 and 10%
Bush Snaths, less than 20 dozen.....	45%

Beyond these prices there are quantity discounts for 20 or 80 dozen of Snaths and for 6 or 25 dozen of Cradles.

Hickory Handles.—A new list on Hickory Handles has been adopted by the members of the Hickory Handle Manufacturers' Association. This list, which has just been issued, bears date September 10, and is given in full below. It will be observed that the list is materially higher than the one it supersedes and is subject also to larger discounts, the result being, however, a considerably higher price for the goods. As a general price to the smaller trade 60 per cent. discount may be named:

Turned Hickory Axe Handles.					
Market and N. Y. patterns.	Extra.	Exclr.	No. 1.	No. 2.	No. 3.
Axe Handles—					
36 and 34 inch.....per doz.	5.75	4.50	3.75	2.90	2.40
32 and 30 inch.....	5.75	4.50	3.75	2.90	2.40
Boys' 28 and 26 inch.....	4.15	3.40	2.70	2.25	...
38-inch, single and double bit.....	6.10	4.90	3.90	3.05	2.45
40-inch, single and double bit.....	6.85	5.65	4.50	3.20	2.60
42-inch, single and double bit.....	7.60	6.00	4.80	3.50	2.75
44-inch, single and double bit.....	8.50	6.75	5.25	3.80	2.90
Straight 30 to 36 inches.....	5.75	4.50	3.75	2.90	2.40
Double bit 30 to 36 inches.....	5.75	4.50	3.75	2.60	2.15

Hand Shaved Hickory Axe Handles.				
Octagon and Oval Hand Shaved, single and double bit.	XXX.	XX.	X.	
Axe Handles—				
36, 34, 32 and 30 inch, plain end.....per doz.	6.60	5.40	4.20	
38-inch, plain end.....	6.90	5.70	4.50	
40-inch, plain end.....	7.50	6.15	4.90	
36 and 34 inch, scroll end.....	7.05	5.85	4.65	
36-inch, Straight Lumberman's.....	6.60	5.40	4.20	
38-inch, Straight Lumberman's.....	6.90	5.70	4.50	
Broad Axe Handles.....per dozen.	5.65			
Adze, House Carpenter, Ship and R. R., 36, 34 and 32 inches.....	6.05	5.25	4.20	...
Post Maul Handles, 30-36 inches.....	5.25	4.50	3.75	3.00

Turned Hickory Pick Handles.					
Surface or R. R., Mattock and Miners'.	Extra.	Exclr.	No. 1.	No. 2.	No. A.
Pick Handles—					
Surface or R. R., 36-inch, per doz.	6.90	5.65	4.50	3.40	2.85
Drifting, 32, 34 and 36 inch.....	5.75	4.50	3.75	...	...
Poll, 32, 34 and 36 inch.....	5.75	4.50	3.75	...	...
Coal Miners' Small Eye, 3 x ¾, 34.....	4.90	3.35	2.65	...	...
Coal Miners' Medium Eye, 3 x ¾, 34.....	4.90	3.35	2.65	...	...
Coal Miners' Large Eye, 3¼ x ¾, 34.....	4.90	3.35	2.65	...	...
Grub Hoe Handles, 36-inch.....	6.75	5.65	4.50	3.40	2.85

Hand Shaved Pick, add 45 cents per dozen to above prices.

Turned Sledge, Tool and Maul Handles.							
Sledge, Tool or Maul.	Length.	11 in.	12 in.	13 in.	14 in.	15 in.	16 in.
Extra.....per doz.	2.80	2.95	3.25	3.85	4.10	4.40	4.75
No. 1.....	1.90	2.20	2.50	3.00	3.25	3.40	3.75
No. 2.....	1.35	1.75	1.90	2.10	2.25	2.65	3.00

Hand Shaved Sledge, add 40 cents per dozen to above prices.

Turned Hammer and Hatchet Handles.							
	Length.	11 in.	12 in.	13 in.	14 in.	15 in.	16 in.
Machinists' Hammer.....per doz.	1.05	1.05	1.05	1.05	1.05	1.05	1.20
Blacksmiths' Hammer.....	1.05	1.05	1.05	1.05	1.05	1.05	1.20
Riveting Hammer.....	1.05	1.05	1.05	1.05	1.05	1.05	1.20
Hammer, A. & R. E.....	1.05	1.05	1.05	1.15	1.15	1.15	1.30
Hatchet, Broad or Bench.....	1.05	1.05	1.05	1.15	1.15	1.15	1.30
Hatchet, Shingle.....	1.05	1.05	1.05	1.15	1.15	1.15	1.30
	Length.	17 in.	18 in.	19 in.	20 in.	22 in.	24 in.
Machinists' Hammer.....per doz.	1.20	1.35	1.60	1.60	1.75	1.90	1.90
Blacksmiths' Hammer.....	1.20	1.35	1.60	1.60	1.75	1.90	1.90
Riveting Hammer.....	1.20	1.35	1.60	1.60	1.75	1.90	1.90
Hammer, A. & R. E.....	1.35	1.65	1.90	1.90	...	...	...
Hatchet, Broad or Bench.....	1.35	1.65	1.90	1.90	...	...	...
Hatchet, Shingle.....	1.35	1.65	1.90	1.90	...	...	...

Handles packed in 2 to 12 dozen cases. No charge for cases.

Second Growth Hand Shaved Axe Handles.					
Single and Double Bit.	30 to 36	38	40	42	44
Octagon and Oval, plain end.....per doz.	7.50	8.10	8.65	9.45	10.35
Octagon and Oval, scroll end.....	7.95	8.55	9.10	9.90	10.80

Second Growth Pick Handles.					
Octagon and Oval.	30-inch.	32-inch.	34-inch.	36-inch.	
Drift Pick.....per doz.	7.05	7.05	7.05	7.05	7.05
Poll Pick.....	7.05	7.05	7.05	7.05	7.05
Coal Pick.....	6.00	6.00	6.00	6.00	6.00
R. R. Pick.....	...	...	...	...	7.95

Second Growth Sledge, Tool and Maul Handles.—Octagon and Oval.					
	24 in.	26&28 in.	30&32 in.	34&36 in.	38 in.
Per dozen.....	3.00	3.75	4.05	4.65	5.05
					5.40
					5.85

Second Growth Hatchet and Hammer Handles.							
	Length.	12 in.	13 in.	14 in.	15 in.	16 in.	17 in.
Hatchet, Shingling.....per doz.	1.35	1.35	1.35	1.35	1.50	1.65	1.65
Hatchet, Broad or Bench.....	1.35	1.35	1.35	1.35	1.50	1.65	1.65
Machinists' Hammer.....	1.35	1.35	1.35	1.35	1.50	1.65	1.65
Blacksmiths' Hammer.....	1.35	1.35	1.35	1.35	1.50	1.65	1.65
Riveting Hammer.....	1.35	1.35	1.35	1.35	1.50	1.65	1.65
A. E. & R. E. Hammer.....	1.35	1.35	1.35	1.35	1.50	1.65	1.65
	Length.	18 in.	19 in.	20 in.	22 in.	24 in.	
Hatchet, Shingling.....per doz.	2.05	2.25	2.40	2.40	2.50	3.00	3.00
Hatchet, Broad or Bench.....	2.05	2.25	2.40	2.40	2.50	3.00	3.00
Machinists' Hammer.....	1.65	2.05	2.05	2.05	2.50	3.00	3.00
Blacksmiths' Hammer.....	1.65	2.05	2.05	2.05	2.50	3.00	3.00
Riveting Hammer.....	1.65	2.05	2.05	2.05	2.50	3.00	3.00
A. E. & R. E. Hammer.....	1.65	2.05	2.05	2.05	2.50	3.00	3.00

Shovels and Spades.—The market in this line is running along without special change, prices on the cheap goods, especially, which form so large a proportion of the demand, being referred to as exceedingly low. The condition, indeed, in these goods is unsatisfactory, and the trade are virtually suffering the effects of the high prices maintained for so many years by the associated manufacturers. The capacity of the various plants is certainly far in excess of any normal demand. A comparatively recent feature in the market has been the introduction, to a limited extent, of what may be termed a fifth-grade Shovel, which is intended to meet the requirements of those who desire a cheap, even though low quality, Shovel.

Hatchets.—The trade have recently been surprised by receiving discount sheets from the manufacturers of Hatchets in which reduced prices are announced on purchases not later than November 15, with somewhat higher prices covering the period from November 15 to December 31, such later prices, however, being slightly lower than those now in force. These new prices are also subject, it is understood, to the rebate to be made for good behavior by the commissioner. A similar reduction in price as an inducement to early ordering, is made in regard to goods sold at net figures.

Window Glass.—The report, to which we referred last week, that a wage scale had been agreed upon for the fire of 1904-1905, has been confirmed. This provides for a general reduction of about 10 per cent. below the scale in force at the end of the last blast. Some manufacturers are of the opinion that a reduction of at least 20 per cent. should have been made to meet machine competition, while others think that under the scale agreed upon hand operating factories will be able to make Glass without sustaining any loss, and that if a conservative policy is followed by manufacturers they can maintain prices at 90 and 10 per cent. discount or better for larger sizes of Glass above the third bracket for both single and double, while the price of smaller sizes can be left to the discretion of individual sellers. Since the settlement

of the wage scale many factories have been making hurried preparations for resuming, and by the middle of this month it is thought that a majority of the factories will be ready to commence blowing Glass. New York jobbers' quotations from the jobbers' list of October 1, 1903, are 90 and 15 on the first two brackets and 90 per cent. discount on all larger sizes, single and double. Glass is very scarce.

Rope.—Manufacturers report business satisfactory, purchases including current requirements of merchants, who are pursuing a conservative policy in buying. Prices are apparently steady on the basis of 7-16 inch diameter and larger as follows: Pure Manila, 11½ cents per pound; other grades of Manila, 10¼ to 11 cents, according to quality; pure Sisal, 9 cents; mixed Sisal, 7½ cents.

Oils.—*Linseed Oil.*—There is considerable unevenness in quotations on State and Western Oil, and this unsettled condition is causing slow selling. While no change has taken place in the card price, one crusher is reported as quoting Raw at 37 cents per gallon, in car lots, while other crushers refuse to consider offers below 40 cents. About 41 cents appears to be the asking price to local dealers, in 5 to 10 barrel lots. No irregularity is reported in the price of City Raw. Quotations are as follows: City Raw, in lots of five barrels or more, 43 cents per gallon; in lots of less than five barrels, 44 cents per gallon; State and Western Raw, 41 to 42 cents per gallon, according to quantity. For Boiled Oil there is the usual 2 cents advance per gallon over Raw.

Spirits Turpentine.—The market has gained ¼ cent per gallon during the week as the result of fluctuations in price. Receipts in moderate volume at the South and lack of demand at this point are conditions unexpected at this season by the trade. Quotations in this city, according to quantity, are as follows: Oil barrels, 56¼ to 56¾ cents; machine made barrels, 56¾ to 57¼ cents per gallon.

AMERICAN FORK & HOE COMPANY'S CATALOGUE.

AMERICAN FORK & HOE COMPANY, Cleveland, Ohio, has issued catalogue C, devoted to Hand Farming and Garden Tools. New list prices, new numbers and new code words have in most cases been adopted. The change in list prices has been made for the purpose of adjusting the relative value of each article with its cost. New numbers and new code words were necessary in issuing a full and complete catalogue covering products of all the company's works, and covering regular or light Steel Goods, Heavy Steel Goods of all kinds, Specialties, Handles, &c. This catalogue takes the place of any and all catalogues issued in the past by the company or by any of its constituent companies. It is an attractive and admirably arranged volume.

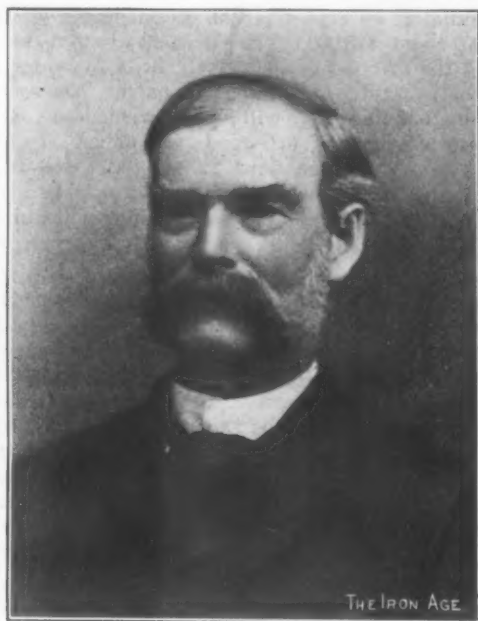
THE ENTERPRISE MFG. COMPANY, Akron, Ohio, with a view to stimulating interest in its products, will mail to dealers gratuitously on application metal and window transparency advertising signs, reproducing in miniature in eight colors the "Bass Rising to Fly," and calling attention to the company's line of Pflueger's Fishing Tackle. The company has also prepared copies of this picture bearing no advertising whatever and suitable for framing, which will be sent to purchasers of \$1 worth of Pflueger's goods from any dealer on receipt of certificate testifying to the purchase and 4 cents in stamps to cover postage. A supply of these certificates can be had from the company on request.

THE SIEG IRON COMPANY, Davenport, Iowa, has passed into new hands, the stock being purchased by R. R. and Harry Englehart, Frank and Fred Yetter, Frank Reavy, E. W. Sass, E. B. Hayes, W. P. Hummel and W. A. Gray. The new Board of Directors is composed of James Bollinger, president; R. R. Englehart, vice-president and manager; Frank Yetter, secretary; Harry Englehart, and E. B. Hayes. The company is now having plans prepared for a modern building.

DEATH OF JOHN CANTWELL.

JOHAN CANTWELL of St. Louis, Mo., died at the Mullanphy Hospital in that city Saturday, September 24, as the result of injuries received in a street car accident August 12. Mr. Cantwell was long a prominent Hardwareman in St. Louis. He was born at Middletown, Conn., October 17, 1836, his parents going to St. Louis with him when he was seven years old. He was educated in St. Louis, and, later in the early 50s began his career as a Hardwareman with the well-known house of Shapleigh, Day & Co., becoming in course of time vice-president of the house, which became A. F. Shapleigh & Co., and later A. F. Shapleigh & Cantwell Hardware Company, now Norvell-Shapleigh Hardware Company. In 1887 he retired from the A. F. Shapleigh & Cantwell Hardware Company and was appointed the direct representative in St. Louis of a number of Eastern Hardware manufacturers.

Mr. Cantwell was widely and favorably known to the trade. In the old days he bought the goods of the



JOHN CANTWELL.

house. He had a remarkably retentive memory and a high order of intellectuality. As manager of a great house, the business of which was established in 1843, he had to be intimately acquainted with large and diverse lines of goods, at a time when illustrated catalogues, with lists and discounts of to-day as aids, were in their infancy, or did not exist. In 1865 he was married to Helen Hunt, who, with two sons, John, Jr., and Frank S., and a daughter, survive him. Mr. Cantwell was greatly esteemed by his associates and possessed a most kindly and charitable disposition. His death will be sincerely mourned by a host of friends and acquaintances.

TRADE ITEMS.

THE F. O. BLAKE SPRAYER COMPANY, Worcester, Mass., has been incorporated under Massachusetts laws to manufacture a Sprayer designed for spraying trees and like purposes. The company will locate its shop in Worcester and will begin manufacturing immediately, orders having already been taken. Frank O. Blake is the president and William L. Porter the treasurer. The authorized capital stock is \$50,000.

EVERY STAMPING COMPANY, Cleveland, Ohio, calls attention to the utility of the Never-Break Steel Spiders in these days when families, and especially dwellers in flats and tenement houses, do most of their cooking over oil, gas or gasoline stoves, which is rather severe on many of the utensils used. The company reports a large demand

for these Spiders, particularly the smallest size, No. 6. These goods are made of a heavy gauge of sheet steel, are seamless, and will not, it is remarked, absorb grease, warp, crack or break from the extreme heat produced by the flame of the burner striking them directly and practically on the same place all the time. The No. 6 Spider has a cooking surface 7 inches in diameter, a half dozen larger sizes, Nos. 7 to 12, being also put on the market.

WM. R. McCULLOUGH, formerly at 23 Warren street, New York, has removed his office to 97 Chambers street, where he is representing for both domestic and export trade the Sandusky Tool Company, Sandusky, Ohio; I. F. Force Handle Company, New Albany, Ind., manufacturer of Hickory Tool Handles, and the Ratcliff Mfg. Company, Agency, Mo., Plain Wood and Metal Bound Saddle Stirrups, for users here and abroad. The Sandusky Tool Company manufactures lines of Tools for carpenters, coopers and cabinet makers, both of metal and wood.

W. A. STOKES & Co., 30 Warren street, New York, manufacturers of and dealers in Wooden Ware, were damaged by fire, which started in one of the upper floors of the building, on September 29, occasioning a loss estimated at about \$15,000. The lower floors were not injured by the fire and comparatively little by water, owing to the efficient work of the fire patrol. On some of their numerous lines they will be inconvenienced for, perhaps, a month, but on such goods as Cabinets, Ladders, Clothes Bars, Work and Card Tables, Skirt and Pastry Boards and similar goods they are even now in a position to make prompt shipments, being fortunate in having manufactured stock on some floors that was uninjured.

FROTHINGHAM & WORKMAN, LIMITED, jobbers of Hardware, Montreal, Canada, are at work on a new catalogue, comprising 800 or 900 pages. They are considering the advisability of issuing it in loose leaf form. The firm of Frothingham & Workman was established in 1809 and is probably the oldest in the Canadian Hardware trade. Some months since it was incorporated under the above style, with the following officers: E. Archbald (a member of the old firm), president; E. C. Eaton, managing director, and Geo. C. Davis, secretary-treasurer. Mr. Davis also has charge of the sales and purchasing departments.

E. E. PERRY, manager of the sales department of the Hopkins & Allen Arms Company, Norwich, Conn., has just returned from the West, and reports the outlook for next year's business full of promise. Stocks of arms are generally light and trade good. The company is preparing for a large demand in 1905.

THE bankrupt stock of the Lawton Cutlery Company, Chicago, which was sold at auction by the referee in bankruptcy September 26, was bought by the Trout Hardware Company, Chicago, and will be transferred to the Trout Hardware Company's store at once.

THE BARTON PARISH REFRIGERATOR COMPANY, Danville, Ill., has been incorporated with a capital stock of \$10,000, to manufacture the Barton Parish Iceless Refrigerator. The officers are as follows: H. M. Kimball, president; Barton Parish, vice-president; W. R. Jewell, Jr., secretary, and W. R. Jewell, treasurer.

KING HARDWARE COMPANY, Atlanta, Ga., is this week entertaining its retail customers and friends through the medium of a fall opening, which is said to be something of an innovation in that section of the country. The establishment is handsomely decorated, and strains of music are heard throughout the different departments, which include Sporting Goods, Tools, Builders' Hardware, Paints, Stoves, Cutlery, Crockery, Bright Goods, and Enameled and Tin Ware. The occasion is under the special and efficient direction of A. B. Ware, manager of the retail part of the company's large and steadily increasing business.

In referring to the output of Files made by Henry Disston & Sons, Philadelphia, in our last issue, it was stated that their output by the end of the year would be

3000 dozen per "week." We are informed that their output at present is 2250 dozen per day, which they expect to increase to 3000 dozen per day before the end of the year. The word week was used instead of day.

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A Manufacturer's Comments on the Catalogue House.

AFTER reading the numerous articles in the various trade journals written by the retail dealers I have often wondered if these dealers realize when they advocate a "boycott" on all goods illustrated in catalogues issued direct to consumers that a number of manufacturers of well-known brands, who have extensively advertised their goods, could profitably market the same direct to the consumer where the articles do not weigh over 15 or 20 pounds, selling all goods on receipt of cash with order delivered, for low transportation rates could be obtained on quantity business, and on many lines more goods would be sold, and at a better profit to the manufacturer and lower cost to the consumer. Of course the advertising would be done in publications read by consumers, and not in trade journals, and the annoyance of jobbers cutting prices, requesting special brands, taking cash discounts after the time had expired, &c., would be eliminated.

In other cases the largest catalogue houses are able to market the entire product of a factory, thus passing both the retailer and the jobber. Furthermore, the Hardware department of any catalogue house is only one of 20 or more departments, and

How Catalogue Houses May Retaliate they can afford to quote prices on their entire line of Hardware at actual cost

rather than be coerced into doing things that are detrimental to their general business, for if the Hardware trade forces the catalogue house to extreme measures, next will come the druggist, then the jeweler, and so on, through the entire line, and the catalogue house realizes this. Drastic measures will mean disaster to the Hardwareman.

It has been repeatedly asserted that, inasmuch as the catalogue houses sell to the same trade as the retailer—viz., the consumer—both should be given the same prices, but the laws of trade always have been, and will be for

Quantity Regulates Price many years to come, that quantity buyers enjoy lower prices than the small dealer. Take, for instance, Nails: The retailer has

one price by the pound and a lower price by the keg; the jobber a keg and carload price. The retailer would sell one dozen Files to a customer lower per File than one only to each of a dozen customers—and can the dealer blame the manufacturer for doing likewise? If a retailer well rated would buy 100 dozen Hatchets on a single shipment for cash he would get as low a price as the jobber; but if 1000 merchants buy one dozen each on separate orders, entailing the extra expense of 1000 different invoices, bills of lading, 1000 checks to pay exchange on, and 1000 different packages to wrap up, &c., the manufacturer could not afford to quote as low as on a single shipment; yet, if the one retailer can get the quantity price, can and should not the catalogue house?

Nearly every retail dealer imagines he is a close buyer. The drummers all "jolly" him along and tell him how extremely low they sell him; how they get 2½ and 5 per cent. more from his competitors, and when his house "calls him down" for selling some item cheap, shows the letter to the dealer as proof, and in a thousand and one other ways proves (?) to the dealer how

Retailers Are Poor Buyers very low he sells him, in particular (the goods he is posted on), for it is a part of the drummer's stock in trade; but I

know from 15 years' personal experience selling the retail Hardware dealers that not one in 20 is an even good all round buyer. The majority are mighty poor advertisers; do not keep their stores attractive or up to date; many with dirty windows and mixed up stock; do not know the merit of their wares, and if a catalogue house customer comes into their store throw rocks at him, until he gets his neighbors to club with him and send away for goods.

I have seen many a retail dealer sit around his store in the winter, in the West, playing cards (for amusement), and when a customer dropped in, not get up to

wait on him, usually inquiring if he wanted to buy anything, and if so, after the hand was played out, wait on him as quickly as possible, and dismiss the customer promptly, so as not to delay the game. Is not such a competitor easy for the catalogue house to meet?

The Way Some Stores Are Run

The catalogue houses that are firmly established are here to stay. They sell but a small part of the Hardware used in this country. They have plenty of capital, well posted buyers, clever advertisers, and the heads are thorough business men; but it

Catalogue Houses Not Likely to Increase is more difficult to establish a large catalogue house than almost any other business, and

the percentage of failures of catalogue houses during the past five years has been greater than in any other line. Their own competition is severe and makes it very hard for a new one to rise, as it means a loss of hundreds of thousands of dollars before getting established under existing conditions. Twenty years ago conditions were more favorable, and I do not look for the catalogue houses to increase their business from now on any more than the natural increase of business in general the country over.

If the retail dealer that is now asleep will wake up, post himself on the goods and prices of his catalogue competitor—for every good sales-

How Retail Merchants Can Hold Their Own man knows what his competitor is doing—advertise in a modern way, keep posted on

all goods he carries as well as new goods, watch his buying, both prices and quantities—and if he is popular, as he should be, with his trade—he should have no difficulty in holding his own, even if the catalogue house sometimes gets a special concession on account of its quantity buying, for its percentage of cost on business transacted is greater by far than the average retailer, the advertising and catalogue expense is something frightful and must be added as a part of the cost to the goods.

The catalogue house cannot sell goods of any amount in any large city because of its expense of doing business, and the retail merchants keep posted and up to date;

Where Catalogue Houses Thrive neither are they successful in the country, where the country merchants do not want the "Dutchman's 1 per cent." profit. But the

catalogue house enjoys the best business in small towns where merchants do business "in any old way," sell goods on long credits—and the credit system has failed many a good merchant.

Articles that many retailers have written for the trade journals during the past six months have resulted in the best advertising that the catalogue houses could have had. Had they written it themselves they could not have done better. When a merchant states that he

Retailers' Confessions cannot meet catalogue house competition, that he pays the jobbers more for goods than the published prices in these catalogues, he certainly shows to the

trade that he is a mighty poor buyer, and also furnishes material for the catalogue houses to use and send broadcast to the consumers, and I have no doubt but what they have taken many extracts from these letters and will use them later on to show the consumers that the retail dealer has gone on record as not being able to buy goods as cheap as they—the catalogue house—sell them. This is certainly all the catalogue houses could ask, and more than they had reason to expect.

Another thing that builds up catalogue houses and department stores in cities, both large and small, is the local organizations that fix uniform prices on articles in general. As a rule, they feel that they are using prices that the consumer cannot help but pay, and when they establish these prices nine organizations out of ten are inclined to place them too high. I know of a local organization in Massachu-

Maintenance of Price by Local Associations setts that is driving the customers to the department stores and to the catalogue houses to buy goods. Take, for instance, 6-inch

Elbows. They have an established price of 25 cents each. The same Elbow can be bought from any jobbing house at 60 cents per dozen. Are not the catalogue house and department store only too pleased to sell this same Elbow for 10 cents? And if they desire to talk quantity let the Hardware merchant have his 25-cent Elbow of a high grade, but he should also carry in stock the 10-cent Elbow to meet this competition. I thoroughly believe in State and national organizations, not particularly to regulate prices, but to work on sane lines. The jobbers

How Associations Can Be Useful

and manufacturers are ready to co-operate, and the retail Hardware dealers of the United States are the most intelligent class of merchants in existence, and it is up to the "live ones" to wake up the "sleepers," for it is the methods of the "sleepers" that enable the catalogue house, department store, racket store, 5 and 10 cent store to thrive. Most of the manufacturers of well-known goods can be persuaded—not forced—to control the catalogue price of their goods, and the jobbers not selling them will prevent the weak ones from growing and the new ones from starting.

Some have suggested that the retailer go direct to the factory, but the jobber is a necessity to the retailer and here to stay. It is absurd to argue that the average retailer who carries a stock of from \$5000 to \$10,000 can order one-quarter of his goods from the factories without loss, taking freight, express, &c., into consideration, or buy unhealthy quantities. Besides, what factory would care to bother with these small orders except at a price above the jobbers' price.

Catalogue Houses Legitimate

The catalogue house is not the green eyed monster that it has been pictured, but a legitimate competitor, and must be met as such.

Competition grows stronger in every line all the time, and those who do not adjust their methods to meet the changing condition can but expect to fall by the wayside; and the Hardware dealers, both jobbers and retailers,

Adapting Methods to Changing Conditions

show their far sightedness in organizing in advance of the other lines, discussing all the difficulties they have to contend with, and by united efforts warding off danger, for in "union there is strength," and every retail dealer in the United States should join his State organization, engage in the deliberations, and by co-operating—not collective buying, which 99 times out of 100 is a failure; looks bright, but is usually a gold brick—can accomplish all expected or desired within the bounds of reason; and catalogue houses will be considered legitimate competitors, their prices regulated, and will not be the "nightmare" they now are to the dealers who are still asleep and have not found out that the "world do move."

I am not a champion of the catalogue houses, would much prefer they did not exist, have had my own troubles with them, and realize their strength, as well as their

The Retailers' Opportunities

weaknesses, and their greatest success depends on the inactivity of the retail dealer, who, if he will but improve his opportunity at the present time, can prevent the growth of the Hardware department of the catalogue house, and minimize the effect of their widely distributed catalogues.

It is the retailer that this letter is intended to benefit, pointing out the shortcomings of the few and cautioning them all to be ever alert and active, for they can, if they will, meet this competition, and meet it successfully, but only by keeping strictly up to the times, and changing

Alertness Activity, Co-operation

their methods as conditions change, assisting the "weaker brothers," and urging them to profit by the experience of the strong, and thus overcome almost entirely the present aggravated situation; but the retailers must have their advance guards out at all times, never for a moment lose sight of their competition, and their united council will devise ways and means to successfully accomplish

the desired end, and I shall sincerely wish and predict that success will crown their efforts.

At various times writers have been criticised for not signing their names to the articles they wrote. Can you blame them? For if your friend has a failing, and you call his attention to this failing, even in the most pleasant

Reason for Withholding Name

way, he often takes offense thereat, and if I should bring the company I represent before the retail dealers in this article, many of them would be disgusted with our methods, and feel that I was "clubbing" them, and would retaliate by pushing the sale of goods of other manufacture; but, on the other hand, the article is written with the most kindly spirit, with the intention of doing the retailer good, if he will but heed the warnings sounded in the article, for it is up to the retail dealer, not the jobber or the manufacturer, and it is the neglect of the retail dealer to keep abreast of the times, as we have stated before, that enables the catalogue house, department store and kindred organizations to thrive.

ED. FORD.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses and are referred to manufacturers:

FROM CLAREMONT HARDWARE COMPANY, Claremont, Minn., successor to James Brennand in Hardware, Stoves, Paints, Sporting Goods, &c.

FROM YERGER, HILL & SON, Smithville, Texas, who have succeeded Mrs. M. Schultz in the Hardware, Stove, Farming Implement, Paint and Sporting Goods business.

FROM REED & WYMAN COMPANY, San Diego, Cal., incorporated with a capital of \$15,000, which has succeeded Mathies Hardware Company, and will continue the wholesale and retail business at the old stand, which will undergo a radical change in arrangement, with a view to carrying a larger and more assorted stock than heretofore.

FROM THE WOODSFIELD HARDWARE COMPANY, Woodsfield, Ohio, which has been incorporated with a capital stock of \$25,000, to conduct the wholesale and retail business in Hardware, Stoves, Tin Ware, Agricultural Implements, Sporting Goods, Paints, Plumbing, Roofing, &c. The company occupies a new store room, 28 by 130 feet, four stories high.

FROM J. F. HARBIDGE, Cantril, Iowa, who has succeeded R. L. Wellborn in the Hardware, Stove, Implement, Paint and Sporting Goods business.

FROM BROWN-WESTBROOK HARDWARE COMPANY, Dillon, S. C., which has increased its capital stock to \$35,000, paid in \$17,500. The company conducts a wholesale business exclusively.

FROM F. O. WEYRICH, Eagle Pass, Texas, who has succeeded Weyrich & Loudon in the Hardware, Stove and Agricultural Implement business.

FROM DIFFENDERFER HARDWARE COMPANY, Caddo, I. T., which has succeeded Diffenderfer-McBride Hardware Company in the wholesale and retail business.

FROM CRESCO HARDWARE COMPANY, Cresco, Iowa, which has lately opened up in the retail Shelf and Heavy Hardware, Paint, Stove, Tinware and Sporting Goods business.

FROM KIB-WARREN HARDWARE & PLUMBING COMPANY, Shawnee, O. T., successor to J. W. Beazley, Shelf Hardware, Stoves, Tinware, Plumbing, Agricultural Implements, &c.

Going Out for Business by Retail Hardware Merchants.

THE suggestions of the editorial in our last issue, in which we urged upon retail Hardware merchants that they follow the example of the manufacturers and jobbers and go out actively in the interest of their business, instead of depending entirely upon customers coming to them, evidently meets with general approval, and in this connection the extracts from the letters which are given below will be read with interest. While many of our correspondents do not deem it feasible to employ a man exclusively as an outside salesman, they recognize the desirability of outside effort by the members of the firm or some of their employees, who shall thus keep in touch with customers or prospective customers, finding out what work is projected, &c. The advisability of this kind of activity will, we believe, be acknowledged by practically every enterprising merchant. The letters which follow are of interest as discussing this subject in its various aspects:

Heartily Approve Canvassing.

From an Ohio Merchant: We very greatly approve of the plan of the retail merchant going out after business. We adopted the system in our business some time ago. We go out and look for new customers, and at the same time try to keep in touch with old customers. We also have had very satisfactory results from the system of writing personal letters to prospective customers. We seldom mention more than one article or one subject in a letter, but try to make our description of this one article very impressive. We think the catalogue house question can be met successfully, but the retail merchant must wake up in order to do this.

Merchants Must Wake Up

Not Only Desirable, but Necessary.

From a Pennsylvania Hardwareman: In my judgment, it is not only desirable for Hardware merchants to work up business by a personal canvass, but this is absolutely necessary in cities and large towns. During the present depression our firm took up the light business in connection with our Hardware lines, jobbing Mantles, Burners and Globes to all the merchants who handle such supplies in our community. This business was all secured by a personal canvass.

A Successful Canvass

Go After Business by all Means.

From a House in Washington: We certainly think a retailer should go after business precisely as the jobber goes after his. As an illustration, one of our local jobbers had their representative call upon us once each month. The last 18 months he has been calling three times each month, and our business with them is at least six times as great as it was before. The contractor, mill owner and larger consumers should be called upon by the retailer as often as possible.

Should Follow Jobber's Example

Canvassing Expensive.

From a Merchant in Michigan: While I can, to a certain extent, work up business by going out personally, or sending some one to canvass for trade, I think that in many cases the cost would more than eat up the profit. If a man's affairs at the store were so arranged that his business could be safely left with his employees, and did not require his personal attention, it would seem to be a good plan for him to get out and stir up business, but it seems to me that the expense of keeping a man for the outside work would, in a great many instances, not be justified by the profits on his work.

Getting Out to Stir Up Business

Pays to Have a Man Out Among the People.

From an Arkansas House: We get good results from sending out into the country men that are well up in our business to canvass for Harvesting Machinery, Cultivators, Vehicles and any class of goods that are sold in such quantities and profit to justify it. Of course, they at the same time put our general line before the people, which we consider beneficial to our trade. We would hardly consider it practical to canvass for Shelf Hardware and the smaller articles, although we do not feel that we are losing anything when we have a man out among the people.

Not Desirable.

From a Michigan House: It is not desirable to canvass for trade, and our reason for taking this position is the illustration we have of the way canvassing works in the implement business, and we think it would lead to a much worse state on account of there being such an endless number of articles in a General Hardware line that in quoting prices, as would have to be done in canvassing, there would be a tendency on the part of the prospective purchaser to get prices badly mixed when he came into the store to pick out what he wanted. In our section it would be difficult to effect a sale until the party had thoroughly investigated. It seems to us that this course would lead to ruinous price cutting, as it has done in the Implement business.

Tendency to Mix Prices

We shall be glad to know the opinions of others on this subject, and shall watch with interest any discussions which may appear in *The Iron Age*.

Canvassing Pays.

From an Arkansas Merchant: I most assuredly think that retail merchants can increase their business by going out personally or sending some one to canvass for trade, and I will add further that it will apply to either city or country wherever there is competition. I have tried it, it pays me, and it will play any one who will go after it in the right way. This will depend somewhat on the number of lines they handle. If they canvass the country they should have a line of Implements, Sewing Machines, Wagons and Buggies, or something outside of Hardware proper. If they have catalogue house competition this will help them to counteract the influence of these houses; if they have no such competition it will help to keep it out, or make them stronger when it does come, which it will certainly do.

Makes It Hard for the Catalogue House

Four Years' Experience.

From a House in Georgia: We think it feasible for a retail merchant to work up business by going out personally or sending some one. We have pursued this course for the past four years, and we think it has paid us or we would have discontinued same.

Returns Would More Than Offset Additional Expense.

From Merchants in Colorado: Without question, the retail merchant could increase his business by personal solicitation or by means of regular solicitor, and in the majority of cases the returns would more than offset the additional expense. It would undoubtedly be a potent means of fighting the encroachments of the catalogue houses.

Worth a Trial.

From a Colorado Merchant: In a district settled so thinly as ours I hardly think it would pay to put out a man to canvass. Still I think it worth a trial.

Merchant Loses a Good Deal Who Doesn't Canvass.

From an Arkansas Merchant: We are of the opinion a merchant loses quite a good deal by not "going after" business. We advise the employment of men whose duty it is to sell smaller articles and post the house of contemplated purchases in larger lines.

Canvassing Would Not Pay.

From a House in Michigan: In my judgment, it is desirable for the retail Hardware dealers to get business in any manner that they can at a profit, but I would not want to be responsible for advising them to go to the expense of getting able representatives to go out among the farmers and solicit trade. I do not believe that this would pay; in fact, I am very certain that it would not. It was this very course which completely ruined the profit in the Farming Implement trade long before catalogue house or like competition was ever dreamed of.

Could Hardly Conduct Their Business Without Canvassing.

From an Illinois House: Regarding the matter of a retail merchant working up his business by going himself or sending some one to canvass for trade in the community in which he resides, we could hardly conduct our business did we not give this branch very close attention. The salesmen in charge of each department are instructed to take the names of all prospective customers, and unless they call very quickly we make a special effort to see them at once regarding the intended purchase. This is done not only in our Hardware department, but also in Furniture, Vehicles,

No Line Neglected

Harness, Paints, Crockery and every line we handle. This effort on our part, coupled with persistent, convincing advertising, changed often, in six different papers, keeps us so busy looking after the trade it brings us that we have no time to howl about catalogue house competition. This howling generally comes from those who have plenty of time to do everything else besides work up their business.

Canvassing a Good Thing.

From a New Hampshire Firm: We think it necessary to solicit trade personally at retail, even from customers who naturally would give us some of their patronage. It shows to them that we appreciate their business by asking for more.

By inquiries of transportation officials and of others, we find very little competition from catalogue houses in this city, and are careful by watching their prices not to place our selling prices too high.

Make Personal Visits in Certain Cases.

From a House in Colorado: The undignified house to house canvass made for several years through our community by the steel Range peddlers has perhaps unduly prejudiced the writer as to this means of obtaining business. While we do not make house visits to solicit general business, we endeavor to be on the lookout for all business brought about by erection of new buildings, installing furnaces, furnishing restaurants or, in fact, any enterprise requiring Hardware by making a personal visit to the proper parties. We endeavor to keep our name and goods we carry

Personality and Friendship

familiar to the people by frequent circular letters calling attention to new and seasonable goods. We believe there should be a personality about a store, a kind of heartfelt cordiality that makes people feel just like we often do when we visit the home of a hospitable friend—a kind of irresistible desire to go again. The old saying that there is no friendship in business does not count one case in a hundred. I believe personal friendship, when coupled with proper treatment, will go as far as anything to keep the trade at home, if we keep the goods.

Canvassing Like Advertising.

From a Michigan Hardwareman: The average Hardware merchant cannot afford the expense of the experiment of sending out an agent or canvasser. There are cases that would produce profit, but it must be in a thickly settled, wealthy community of farmers, and the merchant must be fortunate enough to be able to hire an agent above average ability and loaded with natural energy and "glad hand." Canvassing is like advertising—it would have to be undertaken with zeal, cash and intelligence.

Not Desirable, but Many Times a Necessity.

From a Merchant in Illinois: We do not think it desirable, but find it in many lines a necessity, though not in lines in which we are in competition with catalogue houses. In our opinion the catalogue house of the future will not have as easy sailing as in the past, as now in every town of any size there are stores that make low prices on leading articles that formerly carried very large profits, and we think this has a material influence with the people who would naturally buy from catalogue houses. We have for years made it a rule to meet the prices made by catalogue houses; of course, sometimes on single items that they made leaders we

Competing with Catalogue Houses

would add something to cover expenses of transportation, but we find that their prices on many articles are as high as the average retail Hardwareman should expect to get for them. The hardest part is that some few manufacturers do actually make a better price to the large catalogue houses than they do to the average jobber, and where they use these articles for leaders the price is so low that no one can compete with a profit. We do not think that the manufacturers can be entirely prevented from selling them, but see no reason why when manufacturers generally draw a sharp line between their prices to jobbers and to retailers they should not put the same rule in force to the house that they know will demoralize their prices and frequently compel them to make a lower price themselves, and we think the jobbers owe it to themselves to absolutely refuse to handle any goods they are satisfied the manufacturers are selling to the catalogue house at extreme jobbers' prices.

Seeking Business Desirable in Specific Cases.

From an Illinois Merchant: I think it is desirable for the retail merchant to solicit business personally in some cases, such as factory or contract trade, or others who are liable to mail their orders away without ascertaining what their local dealers can do for them. I think, however, that it would

be very undesirable to have a custom grow up of soliciting domestic trade for Hardware the same as is done by the grocery trade.

A Live Issue.

From a Colorado House: As regards personal canvass for trade, I wish to state that this is a live issue, a subject that should interest every live dealer. It is of vital importance to future trade. He would be a very poor observer who cannot see the results from the vast army of traveling men employed by the Harvester companies and note the aggressive measures used by them "to get trade." Their representative comes to us, and we hire the rig and go with them "after the trade" in the "byways and hedges" and get orders. Result: 25 Mowers, 10 Binders, 25 Rakes, more than last year; and, "on the side," five Wind Mills and Tanks, Pumps, &c., for the same; two Thresher Outfits, five Gas Engine Outfits, two

A Ten Days' Canvass

Grain Drills, besides the vast amount of new trade "worked." The amount of "on the side" trade secured is \$4000 above the profit secured on the goods sold by the Harvester salesman; all done in ten days' canvass.

Does it pay? This was not a Hardware canvass, you say; but it showed results of what actual mingling with the trade will do. If this was on the side, what will the special canvass bring forth? Let us see: Monday, April 4, 1904, in the town of L—r, four salesmen drove into town, each with a nice team and wagon, of special build. They are mysterious looking outfits; we will watch them. They drive to the depot and load their Wagons. What with? you ask. With "the finest product of the factory" of Ranges. They load five on each Wagon, and start out north, east, south and west. Saturday night, April 10, we see them drive into town. With their loads? you ask. No. They have sold every one. Who to? you ask. To our customers. And, to make the matter worse, they sold them

Taking the Merchant's Trade

at \$68 cash, or \$72 on time. The profits taken from us by this week's work were \$700.

But this is not all. The canvass was continued until all were supplied and two carloads were disposed of, to the detriment of our business. We had three of the best and most reputable makes of Ranges constantly on hand, and never thought of holding our trade up for such prices, but were selling them at \$40, \$45 and \$60. Yet this personal canvass took the trade from us, as well as about \$3500 profits we should have had. Does it pay?

We could recite a similar occurrence with another line, but give way to other more observing correspondents.

Before doing so, however, we want to call attention to the operations of the grocery dealers in the way they go after trade every day. And, by the way, they sell a lot of legitimate Hardware by carrying Hardware specials, and instructing their order takers to mention the fact that they have such Hardware dealer." I wish to ask, Is this right on the part of the grocer? And why does it "pay" him, unless it is the volume of business thus increased by such solicitation? Then if it pays the grocer, why not the Hardware dealer? I could call to mind various industries who make their business in this manner, and if it is good for the gander, why not for the goose? If I have gotten this wrong, then may I ask, Who is the goose?"

Some Outside Work Desirable.

From a Merchant in Indian Territory: In many cases I think it profitable for the business if we work some kinds of trade on the outside. For example, if we find out that some one expects to build a house or paint one, or who is figuring on buying a new Range or Stove, or who will need some Fencing, or a Wind Mill, or, in other words, if you can find where you can place a small bill of goods, it will pay you to look after it. I believe in soliciting in this direction, but in general do not think it practical or profitable to solicit orders for everything in the Hardware line. It certainly

Canvassing Catalogue House Patrons

would not pay in this locality. It is plain to see that if you do it all of your competitors would soon do it; hence nothing will be gained.

I do believe, though, that if you know parties in your town who order everything they want from catalogue houses, they should be called on, say, about twice a week, with a view to finding out their wants and showing them the advantages of buying at home, until they are made to believe that the home merchants are good enough. I believe this could be worked in opposition to the catalogue houses to the great advantage of the home merchants.

Trade Winning Methods.

This department will contain a description of approved methods of bringing customers to the store by means of newspaper advertising, circulars and such special expedients and methods as are found useful by enterprising and progressive Hardwaremen.

A cordial invitation is extended to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

PRACTICAL HINTS CONCERNING HARDWARE STORE ADVERTISING } II.

BY GEORGE J. BASSETT.

SELECTING A NEWSPAPER.

IN some cases, of course, it's Hobson's choice and the merchant is to be congratulated on having but one paper to deal with; but in most towns there are rival papers, and sometimes one must choose between them. The intelligent merchant can readily find out what papers reach best the people he wants to interest. It is not always a matter of the size of a paper's circulation—it's the kind of circulation that should be investigated. I have in mind a city with two morning papers. One has more pages and a larger circulation than the other, and yet the smaller paper gets higher rates. And the reason is that this paper lies on the breakfast tables of all the best homes in town. If you are catering to a certain class you must advertise in the papers that class reads. Or, you may solve the problem best by advertising in them all.

The Position of an Ad.

It's worth while to insist on a certain regular position in a paper. If possible have it next to reading matter and on a page devoted to local news. If your ads. are well worded and original people will look for them and wonder "what Jones has to say this week." And they will be more easily found if they're always in about the same location.

It Should Be Well Displayed.

Upon the size and style of an ad. depends to a large extent its prominence before the public. An ad. too small

I have found a 4-inch single column ad., properly set, to be sufficiently large to describe a single article or line of goods such as a family scale, meat choppers, bread mixers, &c.

If possible get from your manufacturer a little outline electrotype of the article you wish to describe, but do not let it be too large, as it will spoil the appearance of your ad. if you overload it with pictures. *The Iron Age* is offering for sale a line of advertising cuts which are especially good for newspaper advertising. Also have a neat and distinctive signature cut of your name and address to place at the bottom of every advertisement.

PRIZE WINNING DISPLAY PAINT WINDOW CONTEST.


SOME months since we gave an illustrated description of the window display arranged by the Springfield Hardware Company, Springfield, Ohio, which secured the first prize in one of John Lucas & Co.'s Paint window contests. The accompanying illustration represents the



Second-Prize Winner in Paint Window Contest.

second prize winner in the same competition, both prizes being awarded to the same parties. The success of the Springfield firm, we understand, was largely due to the extreme simplicity of the exhibits. It is interesting to learn that the window exhibit which took the second prize is credited with selling more than five times the amount of goods for the firm than the display to which the first prize was awarded. The window herewith shown was made up entirely of House Paints in gallons, halves, quarts, pints and half-pints, including Stains, Varnishes, Glosses, Paint and Varnish Removers, Enamels, &c. The chair, wheel and other articles in the window were finished with some one of the products shown. The ground and front of the window were made up entirely of dry colors, making a very attractive base. On the sides and rear of the window were house plans, and color cards of all the various goods made by the manufacturers of the Paints.

THE GRANT NAIL & SUPPLY COMPANY, Boston, Mass., has been incorporated to act as jobbers' and manufacturers' agent of various lines, among the most important of which is Cement Coated Nails, under agency arrangements with the J. C. Pearson Company. The incorporators are John J. Ayre, Richard L. Foster, Arthur S. Aborn and F. A. Lasky. The authorized capital stock is \$50,000.



Bread Making.

THERE are two things in favor of kneading bread by hand—it gives one lots of exercise and it removes any superfluous dirt from the hands. Some people, however, do not appreciate these advantages and prefer to use the Bread Maker claiming that it saves labor, is cleaner and makes better bread. And we happen to know that they are right.

The Universal Bread Maker, has been reduced in price and a larger size is also on the market. We have both sizes.

Regular—4 loaf size, \$2.00
Large —8 loaf size, 2.50

The John E. Bassett & Co.
754 CHAPEL ST.—320 STATE ST.

attracts no attention whatever, while an ad. too large represents just so much money thrown away, unless the business warrants extensive advertising. But in every case the space should be made to count. Stores which use a great deal of newspaper space employ an expert compositor to arrange and set up an ad. before it goes to the paper, in that way insuring an attractive and original style. Any good job printer will do this for you, and it will have the effect of making your ad. "stand out," and in that way do the work of a larger space set in the haphazard way that most newspaper compositors have.

FACTORY COST AND BUSINESS METHODS.

THE FACTORY COST SYSTEM OF THE DAVID J. BRAUN MFG. COMPANY.

FEW persons outside of the business realize the great amount of detail encountered in a modern high grade Chandelier factory, where nearly all goods are made to order from special designs, nor the consequent difficulty in keeping track of the various articles during the process of making, and keeping exact shop cost on the same.

We are indebted to A. J. Tizley, formerly general superintendent of the D. J. Braun Mfg. Company, Chicago, for a description of his system, which has been used in the company's factory during the past five years. This system, which is simple and comprehensive, has proved to be very satisfactory and could, with slight changes, be adapted to a variety of trades.

Extent of Factory.

This firm is one of the oldest in the West and employs an average of 160 men in seven distinct departments,

17023
Order No. 65036
Date, May 2, 1904
Article 3 # 4592 16 H
electrolines
Burrhead Gibb
Drop 96"
Promised July 5th

Fig. 1.—Shop Ticket, Showing Manner in Which Orders Are Issued to Factory; Size of Card, 6 by 6 Inches.

each department being in charge of a foreman, and the whole under the direct supervision of a general superintendent, who is held responsible for the output and operation of the plant. The seven departments are as follows:

BRASS FOUNDRY.
BRASS FINISHERS.
METAL SPINNERS.
IRON WORKERS.
CHANDELIER MAKERS.
POLISHING AND PLATING.
ASSEMBLING AND SHIPPING.

Shop Records.

All shop records are kept in the superintendent's office by a cost and time clerk and are filed in the loose leaf and card systems, all filing being done in numerical order.

Shop Orders.

As a rule, each order goes into the factory from the drawing room with a scale size working drawing of the article to be made, attached to a shop ticket, printed on thin cardboard, size 6 x 6 inches, as shown reduced in Fig. 1. During the busy season there are usually about 500 of these tickets in the works; so that it will readily be seen that to keep track of these jobs during their travels through the seven departments of a four-story building, and to be able to get out the various

orders promptly as promised (some orders including 25 or more different articles, made on separate tickets) is no easy task.

Record Cards.

Fig. 2 illustrates the record card, size 3 x 5 inches, used to keep track of each shop ticket. The numbers on the top of the card are readily understood from reference to Fig. 1. The seven names represent the department foremen, and the dates underneath the names show when the job entered that department from the department having the next lowest date. Thus the order in which the various departments follow shows the brass

ORDER 65036		NO 4592		TICKET 17023		
HOWARD	MILNE	SHAY	BROD	BANCK	HICKEY	SCHAFF
5/2	5/14	5/19		5/20	5/21	5/24
ARTICLES 3 16 H electrolines Blank & Co.						
REMARKS promised 7/5						

Fig. 2.—Record Card, Showing Progress of Job through Factory; Size of Card, 5 by 3 Inches.

foundry to be first. Reference to the card, Fig. 2, shows that the job went from the office to the brass foundry (Howard) May 2.

Fig. 3 shows the report card, size 4½ x 6 inches, sent in daily by each foreman. These cards indicate to which department each job finished during the day previous was delivered. The superintendent posts these reports himself, daily, on the record cards (Fig. 2), thereby keeping in touch with the general run of the work. Thus a comparison of the record card, Fig. 3, and card represented in Fig. 2 will show that order No. 65,036 was sent from the brass finishing department (Milne) to the metal spinning department (Shay) May 19.

These record cards take up but one small drawer on the desk, and when the article is finished the card is transferred to drawers labeled *Finished Work*. By the method thus described the superintendent keeps track of the orders in their progress through the factory.

Loose Leaf Cost Books.

Fig. 4 illustrates a page of the loose leaf cost book, size 8½ x 14 inches. These pages are inserted in a stand-

Name Milne			
Date 5/19			
Order No.	Sketch No.	Ticket No.	Sent to
65036	4592	17023	Shay
67014	3291	17104	"
67001	4623	17100	Banck
67012	4624	"	Brod

Fig. 3.—Form of Daily Report from Foremen; Size of Card, 4½ by 6 Inches.

ard size and make of cover and, when completed, are transferred to a binder; so that the "live orders" are all contained in one book.

Time and Material Cards.

The time and material cards, illustrated in Figs. 5, 6 and 7, are posted on these leaves daily, for the day

previous. Fig. 5 shows the form of time slip, size 4 x 8 inches, turned in daily by each workman.

Reference to Fig. 4 shows how each item is posted. It may be seen that on May 31 John Brown worked for

time keeper's desk. Opposite each name is one of three letters, P, M. or F., to indicate to which column to extend the price of the employees' labor. These letters stand for pattern, making, finishing.

FROM LOOSE-LEAF COST BOOK

DATE		SOLD TO		ARTICLES		ORDER NO.					
May 2-04		T. W. Blank & Co.		3 #4592 16 light electrolisers		65036 17023					
LABOR						MATERIAL					
ENTERED IN LABORERS' TIME						ENTERED IN COST					
DATE	NAMES	TIME	PATTERNS	MAKING	FINISHING	DATE	PCS.	ITEMS	WEIGHT	COST	
May 31	J. Brown	2 15	67			5/14	48	cast nozzle #312	312	384	
" "	H. Smith	9 -	270			48	"	screws 2132	25 5	711	
June 1	" "	4 45	142			3	"	iron bolts 13	7 2	72	
" 2	" "	2 15	247			3	"	bottom knobs 401	2 4	44	
" "	D. White	3 45	112			1	"	garlands 1109	16 2	1044	
" 7	O. Smith	9 -		270		48		stick bushes 1414		1920	
" 1	R. Ryan	9 -		270		48		towards inlet 1112		576	
" 9	" "	9 -		270		3		stuff jts	19	39	
" 11	" "	7 30		225		5/19	16	1/4" mbr 32" l.	7 14	1534	
" "	B. Paul	3 -		90		3		1 1/2" casing 1' 9" l.	4 3	85	
" "	B. Paul	7 15		217		3		12" blanks #189	3 1	62	
" "	L. Doe	2 -		60		26 ft		#217 chain	13 -	710	
" "	G. Miller	15		07							
" 19	L. H. Jr.	4 30			135						
" 20	" " "	9 -			3 -						
" 21	" " "	9 -			3 -						
" 24	H. Kuehl	7 15		217							
" "	R. Lane	3 15			97						
8.38 16 26 E. 32						58.71					

Fig. 4.—Page of Loose Leaf Cost Book in Which Cost of Each Job is Entered; Size of Page, 14 by 8½ Inches.

2 hours and 15 minutes on job No. 65,036. The time keeper's chart shows him that John Brown is a pattern maker

[illegible]

Fig. 5.—Form of Time Card; Size, 4 by 8 Inches.

rated at 30 cents per hour. This is carried to the "Patterns" column, as shown.

The time keeper's chart referred to is merely a list of the employees' names arranged in alphabetical order for ready reference, posted on a suitable board near the

Fig. 6 illustrates the material card, size 6 x 9 inches, filled in by the stock keeper before the material leaves the brass foundry for the brass finishers' department. This card gives the number of pieces of each article furnished, the number of the pattern used, when the articles are castings the rate (per pound for castings, otherwise per each article), and the weight in pounds

ORDER NO. 65036
17023

SKETCH NO. 4592

MATERIAL ONLY

DATE May 14-04

PCB.	ARTICLES	NO.	DATE	LBS.	OZ.
48	cast nyphe	312	8		
48	" sholls	3132	28	25	5
3	" non bockie	13	10	9	2
3	" bottom knotes	1108	28	2	4
8	" garlands	1109	84	16	2
48	stock knotes	1414	40		
48	cast inlet (turned)	1112	12		
3	" stiff joint	19	24	1	11

Fig. 6.—Material Card: Size, 6 by 9 Inches.

and ounces. Reference to Fig. 4 will show how this is posted in the cost book.

This card (Fig. 6) is returned to the stock keeper and filed by him in suitable drawers. If at any time during the progress of the job through the various departments it is necessary to change or replace any article on the job, the stock keeper has but to note the change on this material card and return the same to the cost clerk for posting, as before.

Requisition Slip.

Fig. 7 represents the requisition slips, size 5 x 5 inches, issued by the department foremen for such addi-

tional supplies of material, such as sheet metal and tubing, as are needed to add to the job in their respective departments.

Comparative Cost Card.

Upon the completion of each job the cost for each article made is carried to the cost card, Fig. 8, size 3 x 5 inches. Reference to Fig. 1 will show how Fig. 8 is laid out for reference. This card (Fig. 8) shows the total cost for each fixture made, also the cost of each of the four main classifications to be considered in estimating on the cost of any class of work—viz., material, making, finishing and quantity.

The card has three lines, that a comparative cost may be taken if the same article should be made a second

REQUISITION.		Date
Order No. 65036	Sketch No. 4592	5/19
		LB. OZ.
16 pcs 5/8" tubing-32"	7.	14
3 " 1 1/2" casing 8'9"	4	3
3 " 12" blanks 418g	3	1
26' * 217-brass chain	13	—

Fig. 7.—Requisition Slip for Additional Material; Size of Slip, 5 by 5 Inches.

time. The illustration shows a second cost for job finished about three weeks later—i.e., July 1, 1904.

A variation is noted between the two costs, and an investigation and comparison of the two cost sheets will show that the difference in the prices of the making and finishing is due to the difference in the quantity made. Three fixtures were made the first time and but one the second time. The difference in the cost of material was

NO.	ORDER	DRAWING				
4592	65036	217-2				
LIGHTS	COST	MATERIAL	MAKING	FINISHING	QUANTITY	DATE
16	27.76	19.57	5.42	2.77	3	4/25/04
16	30.43	19.63	7.31	3.49	1	7/1/04
ORIGINAL ORDER 3 electroliers, drop 96"						
Burnished Gift						
MADE FOR Blank & Co						
OTHER NOS. H 437 B. 1112						
PRICE 45.—						
PATTERNS 8.38 TOOLS none						

Fig. 8.—Cost Card Summarizing Elements of Cost; Size, 3 by 5 Inches.

due to a slight difference in the weight of the castings in the rough. Such comparative costs are an invaluable reference to the salesman and estimator.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

INTERNATIONAL MFG. COMPANY, Columbus, Ohio: Illustrated pamphlet devoted to the working and advantages of the Columbus Recording Lock. The Lock is designed for use on stores and other buildings, and records the particular key that locked or unlocked the door, with the hour, minute, day and month that the Lock was operated.

CYCLONE WOVEN WIRE FENCE COMPANY, Waukegan, Ill.: Illustrated catalogue of Ornamental Fence and

Gates in various styles, also the Cyclone Spring Steel Farm Fence.

THE H. & H. MFG. COMPANY, 554-562 West Twenty-fifth street, New York: Catalogue D relating to Copper, Brass and Nickel Plated Ware, including Tea and Coffee Pots, Five o'Clock Teas, Trays, &c., Bathroom Fixtures and Kitchen and Household Furnishings.

BUTLER BROTHERS, New York: Catalogue No. 514, October, 1904, prices of which went into effect September 26. The book contains more than 440 pages, with illustrations, descriptions and net prices of goods sold to the retail trade only. Prices in this catalogue supersede all others published by the company.

O. B. READ MFG. COMPANY, Troy, N. Y.: Pamphlet devoted to Rein Supporters, to be attached to the hip strap of harness, to hold the reins in position on horses' hips.

UNITED STATES NOVELTY MFG. COMPANY, 61 Clymer street, Brooklyn, N. Y.: Catalogue of Miniature Tools for watch charms, including Wrenches, Hammers, Clamps, Butchers' Steels, Drawing Knives, Cleavers, &c.

THE NATIONAL HANDLE COMPANY, Cleveland, Ohio, export office 503 Bowling Green Building, New York: Catalogue devoted to Fork, Hoe, Rake, Shovel, Spade and Scoop Handles.

AMESBURY THERMOMETER COMPANY, Amesbury, Mass.: Metallic Thermometers for domestic, advertising and mechanical purposes. They are made in sizes 3, 4, 6 and 9 inches in diameter, with either brass, polished brass, oxidized or nickel finished cases. The dials are of sufficient size to allow printing on them a neat display card as an advertisement.

THE WIRE GOODS COMPANY, Worcester, Mass.: Pamphlet of changes referring to Discount Sheet No. 21 of January, 1904, applying to catalogue of January, 1903.

D. W. BOSLEY COMPANY, Chicago, Ill.: Illustrated catalogue and price-list relating to Rubber, Felt and Metallic Rubber Weather Strips, Rubber Window Cleaners, Rubber Bar and Counter Cleaners and Rubber Floor Scrubbers.

JOSEPH BARDSLEY, 147-151 Baxter street, New York: Illustrated catalogue and price-list devoted to Door Check and Spring, Checking Spring Hinges for double-acting doors, Pivot Hinges, Door Holders, Wood Door Knobs, Door and Floor Stops, Wood Escutcheons, Shutter and Drawer Knobs, &c.

THE LARIMER MFG. COMPANY, Chicago, Ill., Louis D. Boggs, 23 Warren street, New York, Eastern and export representative: Twenty-four page booklet catalogue, illustrating a new line of Larimer Improved Door Checks and Springs, in five sizes, together with a group of Checks only for doors, from screen and very light inside to heavy outside doors, the Larimer Gate Spring, Neher Door Holder and Gem Screen Door and Cupboard Catch being also shown.

THE BARNES MFG. COMPANY, Mansfield, Ohio: Porcelain Enameled Ware. The company issues a booklet illustrating a fine line of Porcelain Enameled Ware, including Roll Rim Lavatories, in four patterns, and Roll Rim Sinks with separate backs.

DILLE & MCGUIRE MFG. COMPANY, Richmond, Ind.: Souvenir catalogue, illustrating the company's plant and how its Lawn Mowers are made. The various operations through which Mowers pass are shown by full page reproductions of photographs of the various departments of the factory.

RATCLIFF MFG. COMPANY, successor to Woolworth & Cowles Company, Agency, Mo.: Revised catalogue of Wood and Metal Bound Stirrups, printed in English and Spanish. The terminal figure to each number indicates width of Stirrup tread. The business was established in 1870 and incorporated in 1901, the company having recently built an additional factory, equipped with the most improved machinery. Many of the Wood Stirrups are bound with aluminum, light and heavy brass, zinc, iron, and light and heavy galvanized iron. Electrotypes about 1 1/2 inches square will be furnished for catalogue and advertising use where regular illustrations are too large. W. R. McCullough, 97 Chambers street, New York, is Eastern and export representative.

Letters from the Trade.

Our readers are invited to discuss in these columns questions of trade interest connected with the manufacture or sale of Hardware. We shall be pleased to have a free expression of opinion on subjects deserving the attention of Hardware merchants and manufacturers.

SUPPORTS "PETE FROM THE COUNTRY."

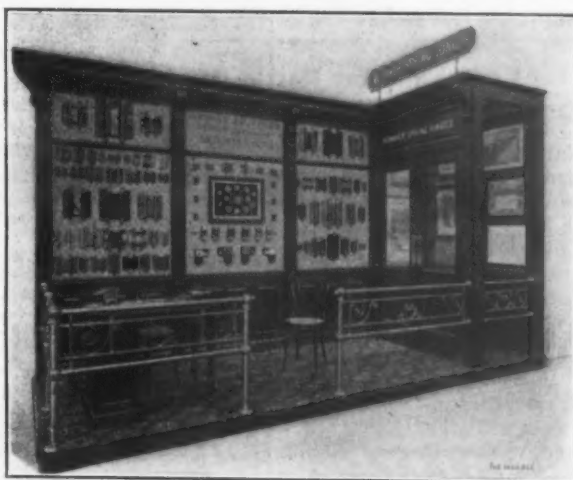
From a Maryland Merchant: P. F. T. C.'s Price Card letter, published in your issue, 22d inst., is all right. Human nature is pretty much the same in Maryland as in Maine. We prevent, as far as possible, the comparing of prices by our customers, prospective and otherwise, by giving lump prices, avoiding itemized prices when possible. A merchant must take advantage of favorable purchasing to even up purchases made under adverse conditions.

PRICE CARDS IN THE WINDOW.

From a Hardware Merchant in Missouri: In regard to the above, "Pete from the Country" has a good story in *The Iron Age* of 22d inst. Among other things he says it may do to put price cards in the windows in cities, but we say no; it is just as ruinous to business in city as in country. Those who make a practice of marking goods in windows at reduced prices help to cut their own throats. One puts down the price of some article below a reasonable profit, and another puts down something else. The customers are smart enough to go around and pick up these bargains and buy other goods where they get them cheapest. Dealers who make a practice of the above should not say a word against mail order and department stores running our business. Instead of resolving this, that and the other, they should try to do a straightforward business, than which there is nothing better in the whole world. "PAUL FROM THE CITY."

ST. LOUIS EXHIBIT OF BOMMER BROTHERS.

BOMMER BROTHERS, Brooklyn, New York, have an artistic exhibition of their Spring Hinges of all kinds at the Louisiana Purchase Exposition at the corner of aisles 5 and 6 in the Palace of Manufactures. In the



St. Louis Exhibit of Bommer Brothers.

central panel of samples is a framed collection of the numerous gold medals and diplomas awarded the firm's goods at previous international expositions. At one end of the exhibit are Swinging Doors demonstrating the ability of their Spring Hinges. The fixtures are of solid polished mahogany, modest, but effective in design. The panels are of brocaded silk of a subdued sea green color, which sets off the handsomely finished goods in an attractive manner.

J. B. Gum has bought the Hardware, Stove, Implement, Paint and Furniture business of Frank Hara, Alton, Mo.

F. E. MYERS & BRO.'S CATALOGUE.

F. E. MYERS & BRO., Ashland, Ohio, have issued Catalogue No. 40, with illustrations and complete description of their factory product, which includes Pumps, Hay Tools, Door Hangers, Store Ladders, &c. The catalogue contains 374 pages, and in it special pains have been taken to enlighten the dealer and his salesmen regarding the goods by a minute description of patented and novel features, workmanship, material, lists, tables, &c. The catalogue gives harmonized lists for substantially one discount so as to enable the dealer to sell what is illustrated, described and listed, or any of the implements which he may not have in stock. The factory is fully equipped with modern machinery, driven by electric power produced by natural gas. With the exception of a few pages of the catalogue describing Tools, Hose, &c., the company manufactures the entire line shown. It is also interested in the manufacture of Iron, Pipe, Lumber, &c., to the extent of supplying requirements in these lines for manufacturing purposes.

MALLORY-WHEELER COMPANY'S PADLOCK CATALOGUE.

THE MALLORY-WHEELER COMPANY, New Haven, Conn., Lewis D. Boggs, 23 Warren street, New York, direct representative, has just issued a fine 92-page large leaf catalogue of Padlocks. In it are shown large assortments of Steel and Wrought Brass, Cast Bronze and Brass, Dog Collar, Scandinavian, Wrought Iron, Galvanized Wrought Iron and Gun Metal Switch Padlocks. In front are several pages in *fac-simile* colors of dozen assortments of Padlocks on display cards, from which to sell. There are also several pages of Steel Padlocks in red, green and purple colors, designed particularly for export.

HOLLEY MFG. COMPANY'S CUTLERY CATALOGUE.

THE HOLLEY MFG. COMPANY, Lakeville, Conn., has issued a 125-page illustrated catalogue, in which are shown 132 full size engravings, representing an aggregate of 575 varieties of Pocket Knives, composing their regular line. This business, established in 1844 and incorporated ten years later, is said to be the oldest Pocket Cutlery factory in the United States. All blades are hand forged from best steel and warranted. For the convenience of the dealer a numbering system has been adopted, as follows: The first figure in each number indicates the number of blades; the second figure the kind of material in handle, as cocoa, ebony, white bone, imitation stag horn, buffalo horn, ivory, genuine stag horn, tortoise shell, pearl and metal, the remaining figures in the number designating the pattern. The company also manufactures Shears, Scissors and Razors, which are not shown in this catalogue.

MISCELLANEOUS NOTES.

Cyclone Woven Wire Fence.

The Cyclone Woven Wire Fence Company of Waukegan, Ill., whose fence was illustrated in our issue September 22, also has factories at Holly, Mich., and Cleveland, Ohio. The company advises us that its fence is made in a number of styles, from 6 to 12 bars, and from 20 to 58 inches high, a more extensive line than the notice, as given, indicated.

R. O. Stetson.

R. O. Stetson, Greenfield, Mass., manufacturer of Stratton Brothers' Improved Spirit Levels, in a new catalogue covering his entire line shows several new models recently added—namely, No. 3, No. 0.3 and Dandy. These styles were designed to meet a demand for popular price articles, are finished in cherry and mahogany, with illuminated side and plumb views, heavy square end top

plates and solid brass end plates, polished. The new catalogue above referred to contains a revised price list, and the entire line has been brought up to date.

Puro.

The accompanying cut represents a metallic box containing Puro, which is a heavy paste compound, referred to as antiseptic and non-acid. It is designed for use on the hands and in the bath. It is stated that it invigo-

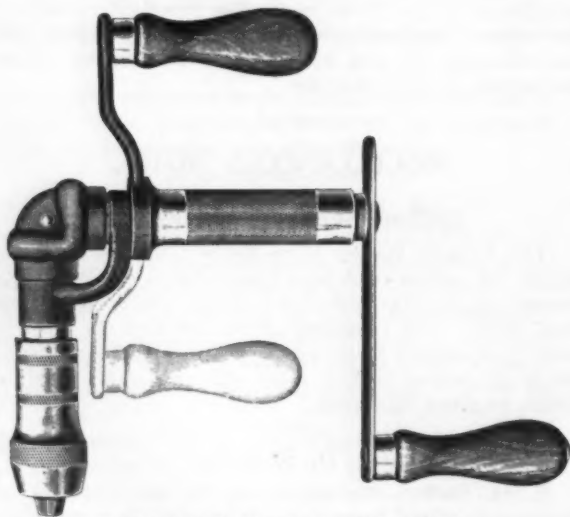


Puro.

rates, tones, cleanses, preserves, and will not injure the most sensitive skin, and that it removes instantly all dirt, machine grease, printers' ink, paint, fruit and vegetable stains, &c. Puro has an invigorating effect upon the skin, it is pointed out, increasing the circulation and removing all impurities from the pores, thereby insuring their perfect action and leaving the skin in a healthy condition. It is claimed for the compound that there is no waste in its use; hence a greater economy than with soap; that its cleansing powers are condensed and greater in proportion than soap and that it is compounded from the purest and best materials known. Puro is manufactured by the Puro Mfg. Company, 203 Broadway, New York, which also puts up household Puro, which is intended for cleaning pots and pans, enameled and tin ware, glassware, windows and woodenware, floors and linoleum, marble and bathtubs, &c.

The Goodell Corner Brace No G-100.

H. H. Mayhew Company, Shelburne Falls, Mass., is just putting on the market the corner brace shown here-



The Goodell Corner Brace No. G-100.

with. The operating handle is adjustable to 9 and 11 inch sweep, while the supporting handle is adjustable to eight positions within the circle. The brace has a bevel

gear drive and it bores parallel holes within $\frac{3}{4}$ inch of a wall or other object. There are, it is claimed, practically no limits to the positions in which it can be used, and heretofore inaccessible places are easily reached. The tool has cocobolo handles, is nickel plated, best of material and workmanship enter into its construction and it occupies a space 7 inches square in the workman's kit.

H. & C. Pancake Register.

The Hart & Cooley Mfg. Company, New Britain, Conn., for whom the Stanley Works, 79 Chambers street, New York, are selling agents, have put on the market the H. & C. Pancake special side wall register, here shown. It is made entirely of wrought metal, and from the fact that it sets almost flush against the wall it is called the "Pancake." The material is stamped from tough, high grade wrought steel, which will neither break nor bend. Some of the advantages claimed for this construction are the thinness of the metal, saving



H. & C. Pancake Special Side Wall Register.

shelf room; adaptability to thin partitions and lightness, as compared with cast registers, and consequent saving in freight; finely rounded fret work and perfect operating mechanism. It is made in seven sizes, from 8 x 10 to 12 x 15 inches, inclusive, and in 18 finishes. It has only one slot or louver and is almost flat. As shown in the illustration, a narrow flange fits into the tin box, and the register is fastened to this by four screws.

Musical Rattle Drum.

Noble & Cooley, Granville, Mass., branch of the National Novelty Corporation, are offering the drum shown herewith. It is made in one size, with metal



Musical Rattle Drum.

shell, sheepskin heads $7\frac{1}{2}$ inches in diameter, and decorated with the national colors. All tunes, it is remarked, can be played on this instrument without sticks, also a child can play it effectively with but little practice. Instructions are printed on each drum. The instrument is designed chiefly for campaign purposes and for the holiday trade.

Current Hardware Prices.

REVISED OCTOBER 4, 1904

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 1/2 @ 33 1/2 & 10% signifies that the

price of the goods in question ranges from 33 1/2 per cent. discount to 33 1/2 and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, Φ doz. \$3.00..... 33 1/2
North's..... 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Iven's Patent..... 35%
Taplin's Perfection..... 35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvil..... Φ doz. 7 1/2 @ 7 1/2
Hay-Budden, Wrought..... 3 1/2 @ 3 1/2
Horseshoe brand, Wrought..... 3 1/2 @ 3 1/2
Trenton..... Φ doz. 9 @ 9 1/2

Imported—

Peter Wright & Sons..... Φ doz. 10 1/2 @ 10 1/2

Anvil, Vise and Drill—

Millers Falls Co., \$18.00..... 15 & 10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co..... 33 1/2

Augers and Bits—

Com. Double Spur..... 75 @ 75 & 10%
Boring Machine Augers..... 70 @ 10 @ 75%
Car Bits, 12-in. twist..... 60 @ 60 & 10%
Jennings' Pattern..... 60 @ 10 @ 70%
Ford's Auger and Car Bits..... 40 & 5%
Forster Pat. Auger Bits..... 25%
C. E. Jennings & Co.,
No. 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 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826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 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Can Openers—See Openers, Can

Cans, Milk—
 5 8 10 gal.
 Illinois Pattern, \$1.35 1.85 2.05 each.
 New York Pattern, 1.50 2.20 2.45 each.
 Baltimore Pattern, 1.50 2.20 2.45 each.
 Dubuque, 1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
 3 5 10 gal.
 \$45.00 60.00 120.00 gro., net

Caps—Perousson—

Eley's E. B. \$3.50 @ 55c
 G. D. per M 34 @ 35c
 F. J. per M 40 @ 42c
 G. E. per M 48 @ 50c
 Musket. per M 62 @ 63c

Primers—

Berdan Primers, \$2.00 per M. 20¢
 B. L. Caps (Sturtevant Shells) 30¢
 \$2.00 per M. 30¢
 All other primers per M. \$1.52 @ 1.60

Cartridges—

Blank Cartridges:
 38 C. F., \$5.50 10¢ @ 55¢
 38 C. F., \$7.00 10¢ @ 55¢
 21 cal. Rem., \$1.50 10¢ @ 55¢
 32 cal. Rem., \$2.75 10¢ @ 55¢
 B. B. Caps, Con. Base Suggd. \$1.90
 B. B. Caps, Round Ball. \$1.45
 Central Fire \$1.25
 Target and Sporting Rifle. 15¢ @ 10¢
 Primed Shells and Bullets. 15¢ @ 10¢
 Rim Fire Sporting. 50¢
 Rim Fire, Military. 15¢ @ 5¢

Castors—

Bed. 70¢ @ 70¢ @ 10¢
 Plate. 60¢ @ 50¢ @ 10¢
 Philadelphia. 75¢ @ 75¢ @ 55¢
 Acme Ball Bearing. 33¢ @ 45¢
 Boss. 70¢ @ 10¢
 Ross Anti-Friction. 70¢ @ 10¢
 Gem (Roller Bearings). 80¢
 Martin's Patent (Phoenix). 45¢
 Standard Ball Bearing. 45¢
 Tucker's Patent low list. 80¢
 Yale (Double Wheel) low list. 50¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Straight Link:
 5-16 3/4 5-16 3/4 7-16 3/4 9-16 3/4
 7-16 3/4 9-16 3/4 11-16 3/4 13-16 3/4
 15-16 3/4 17-16 3/4 19-16 3/4 21-16 3/4
 23-16 3/4 25-16 3/4 27-16 3/4 29-16 3/4
 31-16 3/4 33-16 3/4 35-16 3/4 37-16 3/4
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Forks—

Base Discounts Aug. 1, 1899, list:	
Hay, 3 tine.....	60¢10¢55
Boys' & Fish, 2 tine.....	60¢10¢55
Hay & Boys', 3 tine.....	60¢55
Hay & Boys', 4 tine.....	60¢55
Champion Hay.....	60¢55
Hay & Header, long 3 tine.....	65¢
Header, 4 tine.....	65¢
Barley, 4 & 5 tine, Steel.....	60¢20¢
Manure, 4 tine.....	60¢15¢14
Manure, 5 & 6 tine.....	65¢14¢14
Spading.....	70¢25¢
Potato Digger, 6 tine.....	60¢10¢
Sugar Beet.....	40¢10¢
Coke & Coal.....	40¢10¢
H-avy Mill & Street.....	65¢
Wagon Dig Potato.....	60¢10¢
Victor, Hay.....	60¢15¢25
Victor, Manure.....	60¢10¢
Victor, Header.....	65¢
Champion, Hay.....	60¢10¢
Champion, Header.....	65¢
Champion, Manure.....	60¢15¢25
Columbia, Hay.....	60¢20¢
Columbia, Manure.....	70¢
Columbia, Spading.....	70¢12¢14
Hawkeye Wood Barley.....	40¢
W. & C. Potato Digger.....	60¢10¢
Acme Hay.....	60¢20¢
Acme Manure, 4 tine.....	60¢10¢55
Dakota Header.....	60¢20¢
Jackson Steel Barley.....	60¢20¢
Kansas Header.....	65¢
W. & C. Favorite Wood Barley.....	40¢
Plated.—See Spoons.	

Frames—Saw—

White, Straight Bar, p. r. doz.	75¢80¢
Red, Straight Bar, per doz.	\$1.00\$1.25
Red, Double Brace, per doz.	\$1.50\$1.50
Freezers Ice Cream—	
Oct.....	1 2 3 4 5 6
Each.....	\$1.25 \$1.60 \$1.90 \$2.20 \$2.50
Fruit and Jelly Presses—	
See Presses, Fruit and Jelly.	
Fry Pans—See Pans, Fry.	
Fuse—	
Hemp.....	\$2.75
Cotton.....	3.50
Waterproof Single Taped.....	3.55
Waterproof Double Taped.....	4.40
Waterproof Triple Taped.....	5.15

Gates Molasses and Oil—

St-bins' Pattern... 80¢10¢80¢10¢55

Gauges—

Marking, Mortise, etc..... 50¢10¢50¢10¢10¢55

Chapin-Stephens Co..... 50¢10¢50¢10¢10¢55

Marking, Mortise, etc..... 50¢10¢50¢10¢10¢55

Scholl's Patent..... 50¢10¢50¢10¢10¢55

Door Hangers..... 50¢10¢50¢10¢10¢55

Staley R. & L. Co.'s Butt & Banbet..... 50¢10¢50¢10¢10¢55

Gauge..... 50¢10¢50¢10¢10¢55

Wire, Brown & Sharpe's..... 50¢10¢50¢10¢10¢55

Wire, Morse's..... 50¢10¢50¢10¢10¢55

Wire P. S. & W. Co..... 50¢10¢50¢10¢10¢55

Gimlets—Single Cut—

Nail, Metal, Assorted, gro. \$1.50\$1.50

Spike, Metal, Assorted, gro. \$2.50\$2.50

Nail, Wood Handled, Assorted, gro. \$1.75\$2.00

Spike, Wood Handled, Assorted, gro. \$1.25\$1.50

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co..... 50¢10¢50¢10¢10¢55

Glue—Liquid Fish—

Bottles or Cans, with Brush..... 25¢50¢

Cans (1/4 pla., pla., qts., 1/2 gal., gal.)..... 25¢18¢

International Glue Co. (Martin's)..... 40¢10¢

Grease Axle—

Common Grade..... gro. \$1.50\$1.50

Dixon's Everlasting..... 10¢10¢

Dixon's Everlasting, in box, 1 doz. 1 lb..... \$1.50; 2 doz. \$2.00

Grips, Nipple—

Perfect Nipple Grips..... 40¢10¢25

Grids, Soapstone

Pike Mfg. Co..... 50¢10¢50¢10¢10¢55

Grindstones

Bicycle Emery Grinder..... 60¢50

Bicycle Grindstones, each..... \$1.50\$3.00

Pike Mfg. Co.

Improved Family Grindstones, per inch, per doz..... \$2.00 38¢

Pike Mower Knife and Tool..... 50¢10

Velox Ball Bearing, mounted, Angle Iron Frames..... each, \$3.25

Halters and Ties—

Cover Mfg. Co..... 40¢25¢

Jute Rope..... 40¢55¢

Sisal Rope..... 40¢55¢

Cotton Rope..... 45¢55¢

Hemp Rope..... 45¢55¢

Cover's Saddlery Works:

Web and Leather Halters..... 70¢

Jute and Manila Rope Halters..... 70¢

Sisal Rope Halters..... 70¢

Jute, Manila and Cotton Rope Ties..... 70¢

Sisal Rope Ties..... 70¢

Hammers—**Handled Hammers—**

Heller's Machinists'..... 40¢10¢40¢10¢10¢55

Heller's Farriers..... 40¢10¢40¢10¢10¢55

Magnetic Tack, Nos. 1, 2, 3, \$1.25 \$1.50, \$1.75..... 40¢10¢40¢10¢55

Peck, Stow, Plumoz..... 40¢10¢55

Plumb, A. E. Nall, 3 1/2 & 7 1/2 & 3 1/2 & 1 1/2 & 7 1/2 & 5 Engineers' and B. S. Hand..... 50¢75¢50¢10¢10¢55

Machinists' Hammers..... 50¢10¢50¢10¢10¢55

Bliveting and Tinner's..... 40¢10¢40¢10¢10¢55

Sargent's C. S. New List..... 40¢

Heavy Hammers and Sledges—

Under 5 lb., per lb., 5¢, 30¢10¢10¢85¢

5 to 10 lb., per lb., 4¢, 30¢10¢10¢85¢

Over 10 lb., per lb., 30¢, 85¢10¢10¢85¢

Wilkinson's Smiths..... 35¢10¢10¢

Handles—**Agricultural Tool Handles—**

Axe, Pick, etc.....	45¢50¢55
hoe, rake, etc.....	45¢50¢55
Fork, Shovel, Spade, etc.....	45¢50¢55
Long Handles.....	45¢50¢55
D Handles.....	45¢

Cross-Cut Saw Handles—

Atkins'.....	40¢55
Champion.....	45¢55 10¢
Diston's.....	50¢

Mechanics' Tool Handles—

Auger, assorted..... gro.	\$2.50\$2.85
Bradawl..... gro.	\$1.65\$1.85

Chisel Handles:

Apple Tanged Firmer, gro. ass'd.	\$2.10\$2.65
Hickory Tanged Firmer, gro. ass'd.	\$2.15\$2.65
Apple Socket Firmer, gro. ass'd.	\$1.75\$1.95
Hickory Socket Firmer, gro. ass'd.	\$1.45\$1.60
Hickory Socket Framing, gro. ass'd.	\$1.60\$1.75
File, assorted..... gro.	\$1.30\$1.40
Hammer, Hatchet, Axe, etc.....	60¢60¢10

Hand Saw, Varished, doz.

Not Varished..... 65¢75¢

Plane Handles:

Jack doz. 30¢; Jack Bolted.....	75¢
Fore, doz..... 45¢; Fore, Bolted 90¢	

Chapin-Stephens Co.:

Carving tool.....	40¢40¢10¢
Chisel.....	65¢65¢10¢
File and Awl.....	65¢65¢10¢
Saw and Plane.....	40¢40¢10¢
Screw Driver.....	40¢40¢10¢
Millers Falls Adj. and Hatchet Auger Handles.....	15¢10¢
Nicholson Simplicity File Handle, 1/2 gro.....	\$0.85\$1.50

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, etc.

Barn Door, New Pattern, Round Groove, Regular:

Inch.....	3 4 5 6 8
Single Doz. \$0.90 1.25 1.60 1.95 2.50	

Barn Door, New England Pattern, Check Back, Regular:

Inch.....	3 4 5 6
Single Doz.....	\$1.30 1.85 2.50 3.00

Reliable No. 1..... per d. z. \$8.00

Reliable No. 2..... per d. z. \$9.00

Chicago Spring Butt Co..... 25¢

Oscillating..... 25¢

Big Twin..... 25¢

Chisholm & Moore Mfg. Co.:

Baggage Car Door..... 50¢

Elevator..... 50¢

Roller..... 50¢

Crank & Carrier Mfg. Co.:

Looms Axle..... 60¢10¢55

Roller Bearing..... 70¢55

Griffin Mfg. Co.:

Solid Axle, No. 10, \$12.00..... 70¢

Roller Bearing, No. 11, \$15.00..... 70¢

Roller Bearing, Ex. H. F., No. 22, \$18.00..... 70¢

Hinged Hangers \$16.00..... 60¢10¢

Lane Bros. Co.:

Parlor, Ball Bearing..... \$4.00

Parlor, Standard..... \$3.15

Parlor, No. 115..... \$2.85

Parlor, New Model..... \$2.80

Parlor, New Champion..... \$2.25

Barn Door, Standard..... 60¢10¢25

Hinged..... net \$6.40

Covered..... 60¢10¢

Special..... 70¢55

Lawrence Bros.:

Advance..... 60¢10¢

Cleveland..... 10¢55

Cupper, No. 75..... 60¢

Crown..... 60¢10¢

Easy Parlor Door, Dbl. Sets, \$25.50..... 60¢10¢

Single Set, \$1.25..... 60¢55

Giant..... 70¢55

Hummer..... 70¢55

New York..... 60¢10¢

Peerless..... 70¢55

Sterling..... 60¢10¢

McKinney Mfg. Co.:

No. 1, Special, \$15..... 60¢10¢

No. 2, Standard, \$18..... 60¢10¢

Hinged Hangers, \$11..... 50¢

Meyers' Stylon Hangers..... 60¢

Richards Mfg. Co.:

Pioneer Wood Track No. 3..... \$2.15

Roller B'g Steel Track No. 10..... \$2.40

Roller B'g Steel Track No. 12..... \$2.30

Roller B'g Steel Track No. 13..... \$2.40

Roller B'g Steel Track No. 14..... \$2.30

Hero Adjustable Track No. 19..... 50¢

Adjustable Track Tandem Trolley Track No. 16..... 50¢

Seal, Steel Track No. 8..... \$1.40

Auto Adjustable Track No. 22, 40¢10¢

Trolley B. D. No. 17..... \$1.40

Trolley B. D. No. 120..... \$2.35

Trolley B. D. No. 121..... \$2.45

Trolley B. D. No. 15..... \$2.60

Safety Underwriters F. D. No. 101 & 225 Tandem No. 44..... 70¢55

Trolley B. D. No. 121..... \$2.35

Palace Adjustable Track No. 122..... 60¢10¢

R. val, Adjustable Track No. 122..... 4¢10¢

Ives' Wood Track No. 1..... \$2.15

Trolley B. D. No. 20..... \$1.6

Trolley B. D. No. 21..... \$1.45

Trolley B. D. No. 27..... \$1.5

Trolley B. D. No. 28..... \$1.60

Roller Bearings Nos. 30, 40, 41, 43, 44..... 70¢55

Anti-friction No. 42..... 60¢10¢

Hinged Tandem No. 4..... 60¢

Trolley Door B. B. Swivel N. 1, 185, 300 Safety Door Hanger Co.:

Storm King Safety..... 60¢

U. S. Standard Hinge..... 60¢

Stowell Mfg. and Foundry Co.:

Acme Parlor Ball Bearing..... 60¢

Ajax Hinge Door..... 60¢

Apex Parlor Door..... 50¢10¢55

Atlas..... 60¢

Baggage Car Door..... 50¢

Climate Anti-Friction..... 50¢10¢

Elevator..... 40¢

Express..... 50¢

Freight Car Door..... 50¢10¢

Interstate..... 50¢10¢

Lundy Parlor Door..... 50¢10¢

Magic..... 60¢

Matchless..... 60¢10¢

Parlor Door..... 50¢10¢

Railroad..... 50¢10¢

Rex Hinge Door..... 50¢

Street Car Door..... 50¢

Steel, Nos. 300, 404, 500..... 50¢10¢

Underwriters' Fir Door..... 40¢

Wild West Warehouse Door..... 50¢

Zenith f. r. Wood Track..... 50¢10¢

A. L. Sweet Iron Works:

Chick Back..... 70¢

Climate Anti-Friction..... 50¢10¢

Eagle..... 70¢

Hyo Hinge..... 60¢

No Perfection..... 60¢

Pilot..... 60¢

Pilot Hinge..... 60¢

Rider Wooster..... 65¢

Western Pattern..... 70¢

Taylor & Boggs Fy Co.'s Kidder's Roller Bearing..... 50¢15¢10¢55

Wilcox Mfg. Co.:

Bike Roller Bearing..... 60¢10¢

C. J. Roller Bearing..... 60¢10¢

Cycle Ball Bearing..... 50¢

Dwarf Ball Bearing..... 40¢

Ives, Wood Track..... 60¢10¢

L. T. Roller Bearing..... 60¢10¢

New Era Roller Bearing..... 50¢10¢

O. K. Roller Bearing..... 60¢10¢55

Prindle, Wood Track..... 60¢

Richards' Wood Track..... 60¢

Richards' Steel Track..... 60¢10¢

Tandem Nos. 1 and 2..... 60¢10¢

Underwriters' Roller Bearing..... 40¢

Velvet..... 50¢

Wilcox Auditorium Ball Bearing..... 30¢

Wilcox Barn Trolley No. 123..... 40¢

Wilcox Elev. Door, Nos. 112 and 122..... 50¢

Wilcox Elev. Door, No. 132..... 40¢

Wilcox Fire Trolley Roller Bearing..... 30¢

Wilcox Le Roy Noiseless Ball Bearing..... 40¢

Wilcox New Century..... 50¢10¢10¢

Wilcox O. K. Trolley..... 50¢

Wilcox Trolley Ball Bearing..... 40¢

Wilcox Wideman Narrow Gauge, Ball Bearing..... 40¢

For Track, see Rail

Wire Goods Co.:
Acme.....00&10%
Chief.....70%
Crown.....70&10%
Czar.....65%
V. Brace.....70&10%
Czar Harness.....00&10%

Wrought iron—
Box, 6 in., per doz. \$1.00; 8 in., \$1.25;
10 in., \$2.50.
Cotton.....doz. \$1.05@1.25
Wrought Staples, Hooks, &c.,
See Wrought Goods.

Miscellaneous—
Hooks, Hens, See Staps. Bench.
Bush, Light, doz. \$4.75; Medium,
\$5.35; Heavy, \$6.35
Grass.....Nos. 1 2 3 4
Best.....\$1.50 1.75 2.00
Common.....\$1.30 1.50 1.60 1.60
Potato and Manure.....60&15%
Wh. Metre.....lb. 5/4@6c
Hooks and Eyes:

Brass.....60&10&10@70%
Malleable Iron.....70&5@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks 35%
Covert Saddlery Works' Self Looking
Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks,
\$2 doz. \$5.25 net

Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—See Nails, Horse

Horsehoes—See Shoes, Horse.

Hose Rubber—
Garden Hose, 1/4 inch:
Competition.....ft. 4 1/4 @ 5 c
3-ply Standard.....ft. 6 1/4 @ 7 c
4-ply Standard.....ft. 7 1/4 @ 8 c
2-ply extra.....ft. 8 1/4 @ 9 c
4-ply extra.....ft. 10 @ 10 1/2 c
Cotton Garden, 1/4 in., coupled:
Low Grade.....ft. 6 @ 7 c
Fair quality.....ft. 8 @ 9 c

Irons—Sad—

From 4 to 10.....lb. 2 1/4 @ 3 c
B. B. Sad Irons.....lb. 3 1/4 @ 3 1/2 c
Chinese Laundry.....lb. 4 1/4 @ 4 1/2 c
Chinese Sad.....lb. 4 @ 4 1/2 c
Mrs. Potts', cents per set:
Nos.....50 55 60 65
Jap'd Tops 62 69 72 69
Tind Tops 65 62 75 72
New England Pressing, lb. 3 1/2 @ 4 c

Pinking—

Pinking Irons.....doz. 50 @ 60 c

Soldering—

Soldering Coppers 2 1/2 and 3.....19 @ 20 c
1 1/2 and 2.....21 @ 22 c

Jacks Wagon—

Covert Mfg. Co.:
Auto Screw.....90&5%
Steel.....45&2%
Covert's Saddlery Works':
Daisy.....60&10%
Victor.....60%
Lockport.....60%
Lane's Steel.....30&10&5%
Richards' Tiger Steel, No. 130.....40%

Kettles—

Brass, Spun, Plain.....20 @ 25%
Enamelled and Cast Iron—See Ware, Follow.

Knives—

Butcher, Kitchen, &c., &c.:
Foster Bros. Butcher, &c., &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%

Corn—

Withington Acme, \$2 doz., \$2.65; Dent,
\$2.75; adj. Serrated, \$2.20; Ser-
rated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 2, \$1.15.

Drawing—

Standard List.....70&10@75&10%
C. E. Jennings & Co. Nos. 45, 46.....60%
Jennings & Griffin, Nos. 41, 42.....70%
Ohio Tool Co., &c.....70%
Swan's.....70&10&2 1/2 c
Watrous.....10&5%
L. & J. J. White.....30&5@25%

Hay and Straw—

Iwan's Sickle Edge.....\$2 doz. \$9.50
Iwan's Serrated.....\$2 doz. \$10.00

Mincing—

Buffalo.....\$2 doz. \$13.00

Miscellaneous—

Furriers'.....doz. \$3.00 @ 3.55
Wootenholm's.....\$2 doz. \$3.00 @ 3.25

Knobs—

Base, 1/4 inch, Birch, or Maple,
Rubber tip, gro.....\$1.10 @ 1.15
Carriage, Jap. all sizes.....gro. 40 @ 45 c
Door, Mineral.....doz. 65 @ 70 c
Door, Por. Jap'd.....doz. 70 @ 75 c
Door, Por. Nickel.....doz. 82 @ 85 c
Bardley's Wood Door, Shutter, &c., 15%
Picture, Sargent's.....60&10&10%

Lacing Leather—

See Belting, Leather.

Ladders, Store &c.—

Laue's No. 6.....25%
Myers Notched Store Ladders.....50%
Richards Mfg. Co.:
Improved No. 112.....40%
Climax Shrif, No. 113.....40%
Trolley, No. 100.....40%

Ladies—Melting—

L. & G. Mfg. Co., Low List.....25%
P. S. & W.....60%
Reading.....60%
Sargent's.....50&10%

Lanterns—Tubular—

Regular Tubular No. 0, doz. \$4.35 @ 4.75
Light Tubular, No. 0, doz. \$4.75 @ 5.25
Hinge Tubular, No. 0, doz. \$4.75 @ 5.25
Other Styles.....40&10@10&10%

Bull's Eye Police—

No. 1, 2 1/4 inch.....\$2.50 @ 2.75
No. 2, 3 inch.....\$2.75 @ 3.00

Lasts and Stands—Shoe—

Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches—Thumb—

Roogin's Latches, with screw, doz. \$5 @ 40c

Door—

Richards' Bull Dog, Heavy, No. 125.....40%

Richards' Trump, No. 137.....50%

Leaders Cattle—

Small.....doz. 55c; large, 60c

Covert Mfg. Co.....35%

Lifters, Transom—

R. & E.....33&5%

Lines—

Wire Clothes, Nos. 13 19 20

100 feet.....\$2.80 3.00 1.65

75 feet.....\$1.80 1.70 1.30

Samson Cordage Works:

Solid Braided Chalk, No. 0 to 3.....40%

Silver Lake Braided Chalk, No. 0, \$6.00;
No. 1, \$8.50; No. 2, \$7.00; No. 3, \$7.50.

Macons' Lines, Shade Cord, &c.: White

Cotton, No. 3 1/2, \$1.50; No. 4, \$2.00; No. 4 1/2, \$2.50; Colors, No. 3 1/2, \$1.75; No. 4, \$2.25; No. 4 1/2, \$2.75; Linen, No. 3 1/2, \$2.50; No. 4, \$3.50; No. 4 1/2, \$4.50.

Tent and Awning Lines: No. 5, White

Cotton, \$7.50; Drab Cotton, \$8.50.....30%

Clothes Lines, White Cotton: 50 ft., \$2.75;
60 ft., \$3.25; 70 ft., \$3.75; 75 ft., \$4.00;
80 ft., \$4.25; 90 ft., \$4.75; 100 ft., \$5.25.

Anniston Waterproof Clothes, 50 ft., \$

\$24.00; Gilt Edge, \$22.00; Air Line

\$22.00; Acme, \$17.00; Alabama, \$15.00;
Empire, \$14.00; Advance, \$13.50; Ori-
ole, \$20.00; Alberman, \$18.50; Eclipse,
\$12.50; Chicago, \$11.00; Standard,
\$10.00; Columbia, \$8.50; Alliston, \$12.50;
Calhoun, \$11.00.

Looks—Cabinet—

Cabinet Locks.....35% @ 33 1/4 @ 7 1/2 %

Door Locks, Latches, &c.—

[Net prices are very often made on

these goods.]

Reading Hardware Co.....45&20%

R. & E. Mfg. Co.....40%

Sargent & Co.....40&10%

Stowell's Steel Door Latches.....50%

Elevator—

Stowell's.....50%

Padlocks—

Wrought Iron.....75&10&5@80&5%
R. & E. Mfg. Co. Wrt. Steel and Brass.....75&10&5%

Sash, &c.—

Ives' Patent.....62 1/2 %

Bronze and Brass.....62 1/2 %

Crescent.....62 1/2 %

Iron.....62 1/2 %

Window Ventilating.....60%

Robison Patent Ventilating Sash

Lock.....40%

Wrought Bronze and Brass.....55%

Wrought Steel.....55%

Fullman Patent Ventilating Lock.....55%

Reading.....60%

Machines—Boring—

Com. Upright, Without Augers.....\$2.00

Com. Angular, Without Augers.....\$2.25

R. & E. Mfg. Co.: Upright, Angular.

Improved No. 3, \$4.25 No. 1, \$5.00.

Improved No. 4, 3.75 No. 2, 3.38

Improved No. 5, 2.75

Jennings' Nos. 1 and 4.....35&5%

Snell's, Rice's Pat. 2.50 2.75

Corking—

Reisinger Invincible Hand Power.....\$2 doz. \$48.00

Fence—

Williams Fence Machines.....each, \$5.50

Holisting—

Moore's Anti-Friction Differential Pul-

ley Block.....30%

Moore's Hand Hook Brake.....30%

Ice Cutting—

Chandler's.....12 1/2 %

Washing—

Boss Washing Machine Co. Per doz.

Clampion Rotary Banner No. 1.....\$54.00

Standard Champion No. 1.....\$48.00

Standard Perfection.....\$25.00

Citrus Square Western.....\$30.00

Uneda American, Round.....\$29.00

Mallets—

Hickory.....45&5@50%

Lignumvite.....45&5@50%

Tinners', Hickory and Applewood,
doz.....50 @ 55 c

Mangers, Stable—

Sweet Iron Works.....50%

Mashers, Vegetable—

Western, W. G. Co., Potato.....60&10%

Mate—Door—

Elastic Steel (W. G. Co.).....10%

Mattocks—

See Picks and Mattocks.

Milk Cans—See Cans, Milk

Mills—Coffee, etc.—

Enterprise Mfg. Co.....25@30%

National List Jan. 1, 1904.....30%

Parker's Columbia & Victoria.....50&10&60%

Parker's Box and Side.....50&10&60%

Swift, Lane Bros Co.....30%

Mowers, Lawn—

Net prices are generally quoted.

Cheap.....all sizes, \$1.75 @ 2.00

Good.....all sizes, \$2.25 @ 2.50

10 12 14 16-inch

High Grade 4.25 4.50 4.75 5.00

Continental.....60&5%

Great American.....70%

Quaker City.....70%

Penn., Iwan, Jr. Ball Bearing.....60&5%

Pennsylvania Golf.....50%

Pennsylvania Horse.....30&5%

Pennsylvania Pony.....60&5%

Philadelphia.....70&5%

Styles M. S. C. K. T.....70&5%

Style A, All Steel.....60&5%

Style E, High Wheel.....70&10&5%

Nails—

Wire Nails and Brads, Papered,
List July 20, 1899.....90 @ 90&10%

Out and Wire. See Trade Report.

Hungarian, Finishing, Upholster-
ers', &c. See Tacks.

Horse—

Nos. 6 7 8 9 10

Anchor.....25 21 20 19 18.....40&5%

Champion.....25 25 24 23.....50%

Coleman.....13 12 11 11.....net

Nos. 6 7 8 9 10

New Haven 23 21 20 19 18.....40&5%

Putnam.....23 21 20 19 18.....33&5%

New Putnam 19 18 17 16 15.....10&10%

Western, per lb.....3 1/2 c

Jobbers' special brands, per lb. 8 @ 3 1/2 c

Picture—

Brass Head.....1 1/4 2 2 1/2 3 3 1/2 in.

Por. Head.....1.10 1.10 1.10 ..gro.

Nippers, See Pliers and Nippers.

Nuts—

Cold Punched.....Off list.

Mfrs. or U. S. Standard.

Square, plain.....\$5.10

Hexagon, plain.....\$5.60

Square, C. T. & R.....\$5.30

Hexagon, C. T. & R.....\$6.00

Hot Pressed:

Mfrs., U. S. or Nar. Gauge Stan'd.

Square Blank.....\$5.80

Hexagon Blank.....\$5.30

Square Tapped.....\$5.80

Hexagon Tapped.....\$5.30

Oakum—

Best or Government.....lb. 6 1/4 c

Navy.....lb. 5 c

U. S. Navy.....lb. 6 c

Plumbers' Spun Oakum.....2 1/2 c

In carload lots 1/4 c lb. off f.o.b. New York.

Oil Tanks—See Tanks, Oil.

Oilers—

Brass and Copper.....50&10%

Tin or Steel.....55&10%

Zinc.....55&10%

Chas. or Paragon:

Brass and Copper.....45&10@50%

Tin or Steel.....65&10%

Zinc.....65&10%

Malleable, Hammers Improved, No. 1,

\$3.90; No. 2, \$4; No. 3, \$4.40; \$ doz. 30%

Malleable, Hammers' Old Pattern,

same list.....50&10%

American Tube & Stamping Co.:
Spring Bottom Cans.....70&10&10%

Railroad Oilers etc.....60&10&10%

Openers—Can—

French.....doz. 35c

Iron Handle.....doz. 25 @ 37 c

Sprague, Iron Hdl., per doz. 35 @ 10c

Screws—Bench and Hand—

Bench, Iron, doz. 1 in. \$2.50 to \$2.75
 1 1/2, \$3.00 to \$3.25; 1 3/4, \$3.50 to \$3.75
 Bench, Wood, Beech, doz. 3/8 to 1/2
 Hand, Wood, 3/8 to 1/2
 R. Bliss Mfg. Co., Hand, 3/8 to 1/2
 Chapin-Stephens Co., Hand, 3/8 to 1/2
 Ohio Tool Co., Bench and Hand, 3/8 to 1/2
Coach, Lag and Hand Rail—
 Lag, Common Point, list Oct. 1.
 99, 80 to 100
Coach and Lag, Gimlet Point, list
 Oct. 1, 99, 75 to 100
Hand Rail, list Jan. 1, '81, 70 to 100

Jack Screws—

Standard List, 75 to 100
 Millers Falls, 50 to 100
 Millers Falls, Roller, 50 to 100
 P. S. & W., 50 to 100
 Sargent, 50 to 100
 Sweet Iron Works, 75 to 100

Machine—

List Jan. 1, '98,
 Flat or Round Head, Iron, 50 to 100
 Flat or Round Head, Brass, 50 to 100

Set and Cap—

Set (Iron or Steel), 75 to 100
 Sq. Hd. Cap, 10 to 25
 Hex. Hd. Cap, 70 to 100
 Rd. or Filler Hd. Cap 65 to 100

Wood—

List July 23, 1903,
 Manufacturers' printed discounts:
 Flat Head, Iron, 85 to 100
 Round Head, Iron, 85 to 100
 Flat Head, Brass, 85 to 100
 Round Head, Brass, 85 to 100
 Flat Head, Bronze, 75 to 100
 Round Head, Bronze, 75 to 100
 Drive Screws, 75 to 100

Scroll Saws—See Saws, Scroll.**Scythes—**

Prices announced for next season:
 Clipper Pattern, Grass, \$6.30
 Full Polished, Clipper, \$6.75
 Grain, \$8.00
 Clipper, Grain, \$8.25
 Weed and Bush, \$8.25

Seeders—Raisin—

Brad Aul and Tool Sets:
 Wood Hdl., 10 Aulds, doz. \$2.00 to \$2.25
 Wood Hdl., 14 Aulds, 6 Tools, doz. \$3.50 to \$3.60

Sets—Aul and Tool—

Alken's Sets, Aul and Tools:
 No. 20, doz. \$10.00; No. 50, \$10 to \$15
 Fray's Adj. Tool Hdl., Nos. 1, \$12; 2, \$13; 3, \$12; 4, \$9; 5, \$7
 C. E. Jennings & Co.'s Model Tool Holders, 30
 Millers Falls Adj. Tool Hdl., No. 1, \$12; No. 4, \$12; No. 5, \$15; No. 10, \$15
 Stanley's Excelsior, No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50; No. 4, \$3.00 to \$10 to \$15

Garden Tool Sets—

Ft. Madison Turf, 5 Hoo, Rake and shovel, 1 doz. sets, \$9.00

Nail—

Square, per gro. \$2.25 to \$2.50
 Round, Btk. and Pol., assorted, gro. \$1.80 to \$2.00

Octagon—

Black Brothers, 27 1/2
 Cannon's Diamond Point, per gr. \$12. 25
 Mayhew's, per gro. \$9.00
 No. 11's Cannon's Diamond Pt. per gr. \$7.20
 Snell's Corrugated, Cup Pt., per gro. \$7.20
 Snell's Knurled, Cup Pt., per gro. \$7.20
 Springfield Mach. Screw Co., Diamond Knurled, Cup Pt., per gro. \$7.50

Rivet—

Regular list, 75 to 100

Saw—

Alken's, 50 to 100
 Genuine, 50 to 100
 Imitation, 50 to 100
 Atkin's, 40 to 50
 Criterion, 40 to 50
 Adjustable, 40 to 50
 Bemis & Call Co.'s, 30 to 40
 Cross Cut, 30 to 40
 Plate, 20 to 30
 Diaston's Star and Monarch, 25 to 30
 Morrill's No. 1, \$15.00; No. 2, \$10.00; No. 3, \$10.00; No. 4, \$10.00; No. 5, \$10.00; No. 6, \$10.00; No. 7, \$10.00; No. 8, \$10.00; No. 9, \$10.00; No. 10, \$10.00; No. 11, \$10.00; No. 12, \$10.00; No. 13, \$10.00; No. 14, \$10.00; No. 15, \$10.00; No. 16, \$10.00; No. 17, \$10.00; No. 18, \$10.00; No. 19, \$10.00; No. 20, \$10.00; No. 21, \$10.00; No. 22, \$10.00; No. 23, \$10.00; No. 24, \$10.00; No. 25, \$10.00; No. 26, \$10.00; No. 27, \$10.00; No. 28, \$10.00; No. 29, \$10.00; No. 30, \$10.00; No. 31, \$10.00; No. 32, \$10.00; No. 33, \$10.00; No. 34, \$10.00; No. 35, \$10.00; No. 36, \$10.00; No. 37, \$10.00; No. 38, \$10.00; No. 39, \$10.00; No. 40, \$10.00; No. 41, \$10.00; No. 42, \$10.00; No. 43, \$10.00; No. 44, \$10.00; No. 45, \$10.00; No. 46, \$10.00; No. 47, \$10.00; No. 48, \$10.00; No. 49, \$10.00; No. 50, \$10.00; No. 51, \$10.00; No. 52, \$10.00; No. 53, \$10.00; No. 54, \$10.00; No. 55, \$10.00; No. 56, \$10.00; No. 57, \$10.00; No. 58, \$10.00; No. 59, \$10.00; No. 60, \$10.00; No. 61, \$10.00; No. 62, \$10.00; No. 63, \$10.00; No. 64, \$10.00; No. 65, \$10.00; No. 66, \$10.00; No. 67, \$10.00; No. 68, \$10.00; No. 69, \$10.00; No. 70, \$10.00; No. 71, \$10.00; No. 72, \$10.00; No. 73, \$10.00; No. 74, \$10.00; No. 75, \$10.00; No. 76, \$10.00; No. 77, \$10.00; No. 78, \$10.00; No. 79, \$10.00; No. 80, \$10.00; No. 81, \$10.00; No. 82, \$10.00; No. 83, \$10.00; No. 84, \$10.00; No. 85, \$10.00; No. 86, \$10.00; No. 87, \$10.00; No. 88, \$10.00; No. 89, \$10.00; No. 90, \$10.00; No. 91, \$10.00; No. 92, \$10.00; No. 93, \$10.00; No. 94, \$10.00; No. 95, \$10.00; No. 96, \$10.00; No. 97, \$10.00; No. 98, \$10.00; No. 99, \$10.00; No. 100, \$10.00; No. 101, \$10.00; No. 102, \$10.00; No. 103, \$10.00; No. 104, \$10.00; No. 105, \$10.00; No. 106, \$10.00; No. 107, \$10.00; No. 108, \$10.00; No. 109, \$10.00; No. 110, \$10.00; No. 111, \$10.00; No. 112, \$10.00; No. 113, \$10.00; No. 114, \$10.00; No. 115, \$10.00; No. 116, \$10.00; No. 117, \$10.00; No. 118, \$10.00; No. 119, \$10.00; No. 120, \$10.00; No. 121, \$10.00; No. 122, \$10.00; No. 123, \$10.00; No. 124, \$10.00; No. 125, \$10.00; No. 126, \$10.00; No. 127, \$10.00; No. 128, \$10.00; No. 129, \$10.00; No. 130, \$10.00; No. 131, \$10.00; No. 132, \$10.00; No. 133, \$10.00; No. 134, \$10.00; No. 135, \$10.00; No. 136, \$10.00; No. 137, \$10.00; No. 138, \$10.00; No. 139, \$10.00; No. 140, \$10.00; No. 141, \$10.00; No. 142, \$10.00; No. 143, \$10.00; No. 144, \$10.00; No. 145, \$10.00; No. 146, \$10.00; No. 147, \$10.00; No. 148, \$10.00; No. 149, \$10.00; No. 150, \$10.00; No. 151, \$10.00; No. 152, \$10.00; No. 153, \$10.00; No. 154, \$10.00; No. 155, \$10.00; No. 156, \$10.00; No. 157, \$10.00; No. 158, \$10.00; No. 159, \$10.00; No. 160, \$10.00; No. 161, \$10.00; No. 162, \$10.00; No. 163, \$10.00; No. 164, \$10.00; No. 165, \$10.00; No. 166, \$10.00; No. 167, \$10.00; No. 168, \$10.00; No. 169, \$10.00; No. 170, \$10.00; No. 171, \$10.00; No. 172, \$10.00; No. 173, \$10.00; No. 174, \$10.00; No. 175, \$10.00; No. 176, \$10.00; No. 177, \$10.00; No. 178, \$10.00; No. 179, \$10.00; No. 180, \$10.00; No. 181, \$10.00; No. 182, \$10.00; No. 183, \$10.00; No. 184, \$10.00; No. 185, \$10.00; No. 186, \$10.00; No. 187, \$10.00; No. 188, \$10.00; No. 189, \$10.00; No. 190, \$10.00; No. 191, \$10.00; No. 192, \$10.00; No. 193, \$10.00; No. 194, \$10.00; No. 195, \$10.00; No. 196, \$10.00; No. 197, \$10.00; No. 198, \$10.00; No. 199, \$10.00; No. 200, \$10.00; No. 201, \$10.00; No. 202, \$10.00; No. 203, \$10.00; No. 204, \$10.00; No. 205, \$10.00; No. 206, \$10.00; No. 207, \$10.00; No. 208, \$10.00; No. 209, \$10.00; No. 210, \$10.00; No. 211, \$10.00; No. 212, \$10.00; No. 213, \$10.00; No. 214, \$10.00; No. 215, \$10.00; No. 216, \$10.00; No. 217, \$10.00; No. 218, \$10.00; No. 219, \$10.00; No. 220, \$10.00; No. 221, \$10.00; No. 222, \$10.00; No. 223, \$10.00; No. 224, \$10.00; No. 225, \$10.00; No. 226, \$10.00; No. 227, \$10.00; No. 228, \$10.00; No. 229, \$10.00; No. 230, \$10.00; No. 231, \$10.00; No. 232, \$10.00; No. 233, \$10.00; No. 234, \$10.00; No. 235, \$10.00; No. 236, \$10.00; No. 237, \$10.00; No. 238, \$10.00; No. 239, \$10.00; No. 240, \$10.00; No. 241, \$10.00; No. 242, \$10.00; No. 243, \$10.00; No. 244, \$10.00; No. 245, \$10.00; No. 246, \$10.00; No. 247, \$10.00; No. 248, \$10.00; No. 249, \$10.00; No. 250, \$10.00; No. 251, \$10.00; No. 252, \$10.00; No. 253, \$10.00; No. 254, \$10.00; No. 255, \$10.00; No. 256, \$10.00; No. 257, \$10.00; No. 258, \$10.00; No. 259, \$10.00; No. 260, \$10.00; No. 261, \$10.00; No. 262, \$10.00; No. 263, \$10.00; No. 264, \$10.00; No. 265, \$10.00; No. 266, \$10.00; No. 267, \$10.00; No. 268, \$10.00; No. 269, \$10.00; No. 270, \$10.00; No. 271, \$10.00; No. 272, \$10.00; No. 273, \$10.00; No. 274, \$10.00; No. 275, \$10.00; No. 276, \$10.00; No. 277, \$10.00; No. 278, \$10.00; No. 279, \$10.00; No. 280, \$10.00; No. 281, \$10.00; No. 282, \$10.00; No. 283, \$10.00; No. 284, \$10.00; No. 285, \$10.00; 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No. 622, \$10.00; No. 623, \$10.00; No. 624, \$10.00; No. 625, \$10.00; No. 626, \$10.00; No. 627, \$10.00; No. 628, \$10.00; No. 629, \$10.00; No. 630, \$10.00; No. 631, \$10.00; No. 632, \$10.00; No. 633, \$10.00; No. 634, \$10.00; No. 635, \$10.00; No. 636, \$10.00; No. 637, \$10.00; No. 638, \$10.00; No. 639, \$10.00; No. 640, \$10.00; No. 641, \$10.00; No. 642, \$10.00; No. 643, \$10.00; No. 644, \$10.00; No. 645, \$10.00; No. 646, \$10.00; No. 647, \$10.00; No. 648, \$10.00; No. 649, \$10.00; No. 650, \$10.00; No. 651, \$10.00; No. 652, \$10.00; No. 653, \$10.00; No. 654, \$10.00; No. 655, \$10.00; No. 656, \$10.00; No. 657, \$10.00; No. 658, \$10.00; No. 659, \$10.00; No. 660, \$10.00; No. 661, \$10.00; No. 662, \$10.00; No. 663, \$10.00; No. 664, \$10.00; No. 665, \$10.00; No. 666, \$10.00; No. 667, \$10.00; No. 668, \$10.00; No. 669, \$10.00; No. 670, \$10.00; No. 671, \$10.00; No. 672, \$10.00; No. 673, \$10.00; No. 674, \$10.00; No. 675, \$10.00; No. 676, \$10.00; No. 677, \$10.00; 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CURRENT METAL PRICES.

OCTOBER 5, 1904.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL— Bar Iron from Store—

Refined Iron:	
1 to 1 1/2 in. round and square.....	\$ 1.75 @ 1.80¢
1 1/2 to 4 in. x 3/4 to 1 in.....	@ 1.05¢
1 1/2 to 4 in. x 1/2 to 1 in.....	@ 1.05¢
Rods—3/4 and 1 1/2 round and square.....	@ 1.05¢
Angles:	
3 in. x 1/2 in. and larger.....	3.00¢
3 in. x 3/4 in. and 1/2 in.....	2.25¢
1 1/2 to 2 1/2 in. x 3/4 in.....	2.00¢
1 1/2 to 2 1/2 in. x 3/4 in. and thicker.....	2.05¢
1 to 1 1/2 in. x 3/4 in.....	2.10¢
1 to 1 1/2 in. x 1/2 in.....	2.35¢
3/4 x 1/2 in.....	2.35¢
3/4 x 1/2 in.....	3.40¢
3/4 x 1/2 in.....	3.00¢
Tees:	
1 in.....	2.45¢
1 1/2 in.....	2.35¢
1 1/2 to 2 1/2 in.....	2.15¢
3 in. and larger.....	2.30¢
Beams.....	3.00¢
Channels, 3 in. and larger.....	2.00¢
Bands—1 1/2 to 6 x 3/4 to No. 6.....	3.05¢
"Burden's Best" Iron, base price.....	\$ 2.85¢
Burden's "H. B. & S. Iron, base price.....	\$ 3.10¢
"H. B. & S. Iron, base price.....	\$ 3.25¢
Norway Bars.....	3.75¢
Norway Shapes.....	4.25¢

Merchant Steel from Store—

Bessemer Machinery.....	per lb. 1.80¢
Toe Chalk, Tire and Sleigh Ropes.....	2.00¢
Best Cast Steel, base price in small lots.....	7¢

Soft Steel Sheets—

1/2 inch.....	2.10¢	No. 14.....	2.30¢
5/16 inch.....	2.30¢	No. 16.....	2.35¢
No. 8.....	2.30¢	No. 18.....	2.45¢
No. 10.....	2.30¢	No. 20.....	2.45¢
No. 12.....	2.30¢	No. 22.....	2.50¢

Sheet Iron from Store.

Black.

	One Pass, C. R.	R. G.
	Soft Steel	Cleaned.
No. 14.....	\$ 2.30	2.40¢
No. 16.....	\$ 2.35	2.50¢
No. 18.....	\$ 2.40	2.50¢
No. 20.....	\$ 2.45	2.60¢
No. 22.....	\$ 2.50	2.70¢
No. 24.....	\$ 2.55	2.80¢
No. 26.....	\$ 2.60	2.90¢
No. 28.....	\$ 2.70	3.00¢

Russia, Planished, &c.

Genuine Russia, according to assortment.....	\$ 1.14 @ 1.16¢
Patent Planished.....	\$ 1.10¢
Galvanized.....	\$ 1.10¢

No. 14 to 16.....	\$ 2.70¢
No. 18 to 20.....	\$ 2.90¢
No. 22 to 24.....	\$ 3.10¢
No. 26.....	\$ 3.30¢
No. 28.....	\$ 3.55¢
No. 30.....	\$ 3.80¢
No. 32.....	\$ 4.00¢
No. 34 and lighter, 36 inches wide, 25¢ higher.	

Foreign Steel from Store—

Best Cast.....	\$ 15¢
Extra Cast.....	\$ 18¢
Swaged Cast.....	\$ 18¢
Best Double Shear.....	\$ 15¢
Blister, 1st quality.....	\$ 13¢
German Steel, Best.....	\$ 10¢
2d quality.....	\$ 8¢
3d quality.....	\$ 5¢
Sheet Cast Steel, 1st quality.....	\$ 15¢
2d quality.....	\$ 14¢
3d quality.....	\$ 12¢
R. Mather's "Special".....	\$ 46¢
"H. B. & S. Iron".....	\$ 10¢
Robinson's Choice X. X. Extra Best.....	\$ 25¢
Jessop Self-Hardening.....	\$ 45¢
Seamans' "Nelson" Steel.....	\$ 40¢
Hobson's "Soho" Special Self-Hardening.....	\$ 43¢

METALS—

Tin—

Duty.—Pigs, Bars and Block. Free.	Per lb.
Banco, Pigs.....	\$ 20 @ 20 1/2¢
Straits, Pigs.....	\$ 20 @ 20 1/2¢
Straits in Bars.....	\$ 20 @ 20 1/2¢

Tin Plates—

American Charcoal Plates.

Caland Grade:	
IC, 14 x 20.....	\$ 2.20
IX, 14 x 20.....	2.70
Melin Grade:	
IC, 14 x 20.....	5.70
IX, 14 x 20.....	6.95
Allaway Grade:	
IC, 14 x 20.....	4.95
IX, 14 x 20.....	6.05

American Coke Plates—Bessemer—

IC, 14 x 20.....	108¢
IX, 14 x 20.....	\$ 4.05
IX, 14 x 20.....	\$ 5.05

American Terne Plates—

IC, 20 x 26.....	\$ 8.00
IX, 20 x 26.....	\$ 10.00

Copper—

Duty: Pig, Bar and Ingot and Old Copper free.	
Manufactured, 2 1/2¢ lb.	
Ingot.....	19 1/2 @ 19 3/4¢
Lake.....	19 1/2 @ 19 3/4¢
Casting.....	19 1/2 @ 19 3/4¢

Sheet and Bolt—

October 22, 1903.

Prices, in cents per pound.

Sheet 30 x 60.

	Not wider than	Not longer than	And longer than	64 oz. & over, soft, sheet, 30 x 60 and heavier.	30 oz. to 64 oz. 25 to 30 lb.	34 oz. to 38 oz. 18 1/2 to 25 lb.	16 oz. to 24 oz. 12 1/2 to 18 1/2 lb.	14 oz. and 15 oz. 11 to 12 1/2 lb.	12 oz. and 13 oz. 9 1/2 to 11 lb.	10 oz. and 11 oz. 7 1/2 to 9 lb.	8 oz. and 9 oz. 6 1/2 to 7 1/2 lb.	Lighter than 8 oz.
1 in.	30	72	18	19	19	20	21	22	23	24	25	26
3/4	30	96	72	18	19	19	20	20	22	25	25	26
1/2	30	96	18	19	19	19	20	21	25	25	25	26
3/8	30	72	18	19	19	19	21	21	23	26	29	
1/4	30	96	72	18	19	19	20	20	23	26		
3/16	30	180	96	18	19	19	20	20	23			
1/16	30	96	18	19	18	18	21	21				
3/32	30	72	18	19	18	21	21	21	26	29		
1/32	30	96	72	18	19	14	22	24	27			
3/64	30	120	96	18	19	21	23	27				
1/64	30	96	18	19	20	20	25					
3/128	30	72	18	19	20	22	22	23		30		
1/128	30	96	72	18	19	20	23	25	26			
3/256	30	120	96	18	20	21	24	27				
1/256	30	96	18	21	21	27						
3/512	30	96	18	20	22	27						
1/512	30	120	96	18	21	24	29					
3/1024	30	96	18	21	22	27						
1/1024	30	120	96	18	21	24	27					
3/2048	30	96	18	21	22	27						
1/2048	30	120	96	18	21	24	27					
3/4096	30	96	18	21	22	27						
1/4096	30	120	96	18	21	24	27					
3/8192	30	96	18	21	22	27						
1/8192	30	120	96	18	21	24	27					
3/16384	30	96	18	21	22	27						
1/16384	30	120	96	18	21	24	27					
3/32768	30	96	18	21	22	27						
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